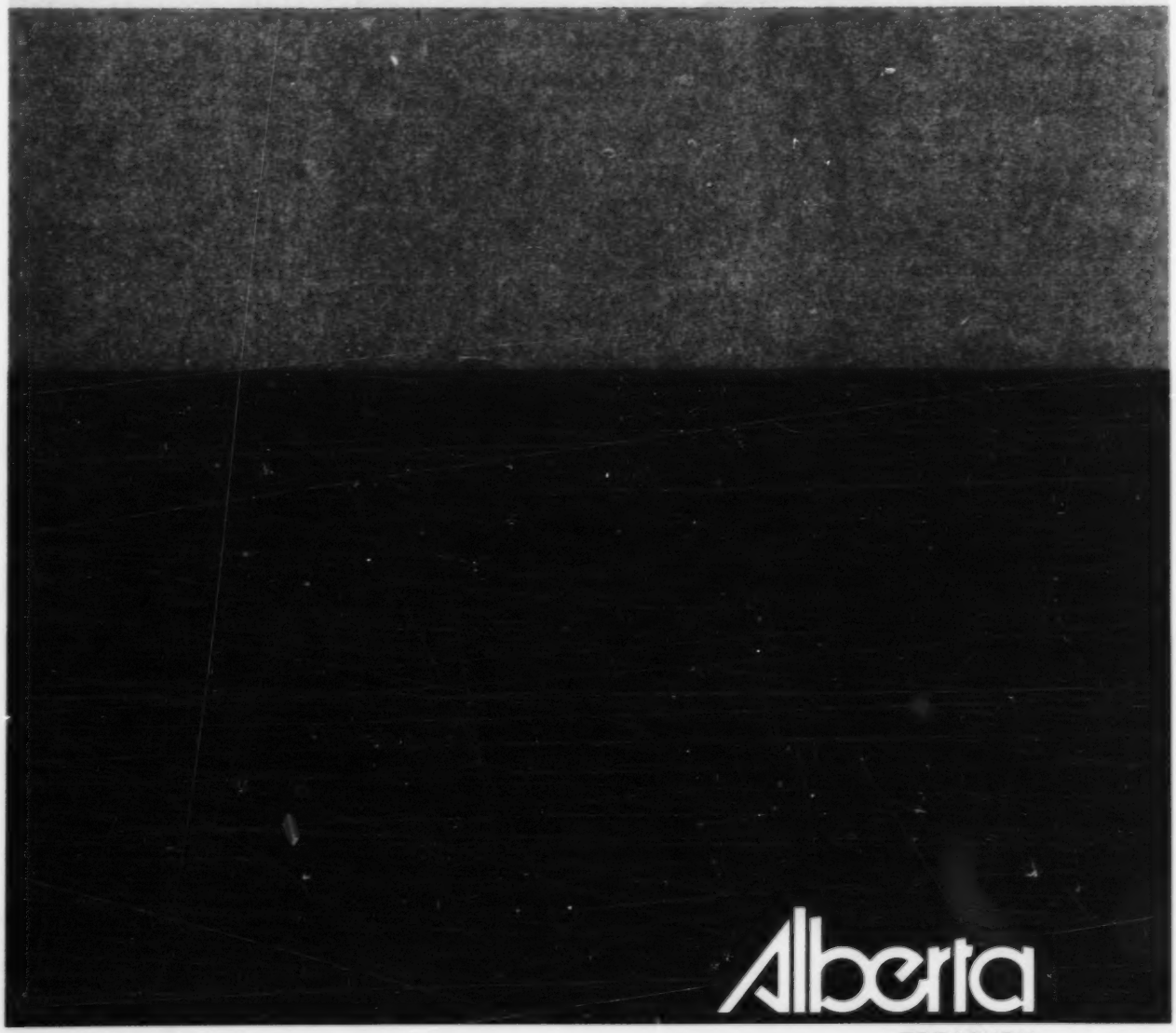
# ALBERTA ECONOMIC MULTIPLIERS

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# ECONOMIC MULTIPLIERS FOR ALBERTA INDUSTRIES AND COMMODITIES
## (Based on 1984 Input-Output Tables)

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May, 1991

## PREFACE

This report presents the most current economic multipliers for household income, gross domestic product (GDP) at factor cost, employment and output for the Alberta economy. The multipliers have been derived from the 1984 provincial input-output tables, which are produced quinquennially by the Alberta Bureau of Statistics based on information acquired from Statistics Canada.

The level of detail presented should be sufficient to meet most needs; however, alternate aggregations of industries and commodities can be produced from the input-output tables. The Economic Models group will attempt to meet special requests for input-output tables or other industry/commodity aggregations, subject to data availability and resource constraints. Enquiries concerning the publication or requests for additional copies of this report should be directed to:

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# ECONOMIC MULTIPLIERS FOR

# ALBERTA INDUSTRIES AND COMMODITIES

## (Based on 1984 Input-Output Tables)

## INTRODUCTION

This report contains economic multipliers for the Alberta economy. The multipliers are 1984-based and produced from the most recent 1984 provincial input-output tables. This data updates the previous 1979-based multipliers published by the Alberta Bureau of Statistics in 1987. Multipliers are provided for up to 38 types of industries and 73 commodities, the same level of detail as the 1979 multipliers.

The report is divided into six parts. Following the Introduction, the "What are Multipliers?" section provides a description of the various types of economic multipliers and their uses. The third section, "Using Multipliers", works through examples of using multipliers to measure the economic impact of a newly established manufacturing plant and a case of increasing exports. The fourth section sets out cautionary notes to be kept in mind when using multipliers. Twelve tables with the multipliers follow as the next section. Finally, the appendix contains data sources, the methodology used in deriving the multipliers, a comparison of the 1984 and 1979 multipliers, and the industry aggregation parameters.

## WHAT ARE MULTIPLIERS?

Economic multipliers provide a means to quantitatively measure and assess the impact of changes in an economy. When there is a change in the economy (business opening/closing/expanding/contracting, changes in the demands for a commodity, tax changes, interest rate shifts, etc.), it impacts first on those firms, households and/or governments most directly involved. Then there is a ripple effect as this impact spreads through the economy affecting other firms, households and governments. Multipliers provide the tool whereby the total impact on the economy - on income, employment, gross domestic product (GDP) and gross output - can be measured.

Multipliers are derived from input-output (I-O) tables which detail the inter-industry relationships of production activities describing how much output each industry bought from and sold to other industries in the economy. Given the vast amount of detail required to compile I-O tables, provincial tables are produced every five years, the most recent being 1984.[1]

The different multipliers presented in the publication are described in this section. The description basically falls into two parts - the measures used to indicate the impact of any economic change and how these measures are derived. Since the measures can be derived under different assumptions a number of separate multipliers result. Thus, a user must be careful to ensure the multiplier chosen is the appropriate one for the situation under consideration.

Four different ways of measuring the impact of economic change are presented in this publication, namely the impact on household income, G.D.P. (at factor cost), employment and gross output. Multipliers for each of these four measures are found in all tables.

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1 Although these multipliers are based on the 1984 input-output tables, and reflect the economic structure of that reference year, studies have shown that these multipliers are reasonably stable over time. Appendix III provides a 1984 and 1979 comparison.

Except for absolute employment multipliers, the interpretation of a multiplier value is basically consistent for all multipliers. The multiplier gives the impact of a unit change in the causal factors (e.g., if a $1 change in industry output or commodity demand results in a $2 impact on G.D.P., the multiplier would be 2.0). For absolute employment multipliers, the figure measures the total impact on number of jobs for every change of $10,000 ( in constant 1984 dollars) in an industry's output (industry multipliers) or in the demand of a commodity (commodity multipliers).

To estimate the multipliers, two basic input-output models - open and closed - are used. Multipliers calculated from the closed input-output model are called "total multipliers", while those from the open model are termed "simple multipliers". When there is a change in the economy (e.g., a production increase in an industry or increased demand for a commodity), the resulting effects can be thought of as emanating out in two ways - a direct and indirect industry effect and an induced income effect. When an industry increases its output, it must obtain more inputs which are provided by other industries. The expansion of these other industries means increased demands are placed on their suppliers, and so on through a chain of interdependent industries. This can be referred to as the industry effect. In addition, as industries increase their production, they increase staff and thus pay more in wages. This increased income in the hands of consumers can generate additional consumption and subsequent resulting increases in industry outputs. This may be referred to as the income effect.

The closed model (i.e., total multipliers) captures both the industry and income effects; the open model (simple multipliers) includes only the industry effect. Total multipliers are provided in this publication. Although simple multipliers have limited use and are not provided in this publication, they are available upon special request. More details about the open and closed models are presented in Appendix II.

For each of the two models (open and closed), multipliers can be derived either for industries or commodities, with or without leakages and in the absolute or ratio form. The various combinations result in twelve total and twelve simple multiplier tables.

With respect to industries and commodities, various levels of aggregation are possible. Two levels - major and detailed - (corresponding to the small and medium aggregations provided in the earlier Input-Output publication) - are presented for each of commodities and industries. Industry aggregation details are provided in Appendix IV. Although commodity aggregation details are not presented, they are available upon request.

## Leakages Vs Without Leakages

Increased demand can be met by Alberta industry produced goods (i.e., domestic production), imports, withdrawals from inventory and government production. The latter three are referred to as leakages from domestic production (i.e., demand which is met by other than Alberta industry produced goods). To the extent these sources supplant domestic production in the supply of a commodity, the impact of an increase in final demand on domestic industries will be reduced.

Multipliers are derived with leakages (i.e., reflecting the actual situation) and without leakages (i.e, under the assumption that all demand is met by domestic production). Comparing a multiplier derived without and with leakages indicates the impact of the leakages on the economy for that particular industry or commodity. Imports are usually the major (and often only) leakage. Thus, if an industry or commodity has a much higher multiplier without leakages than it does with leakages, it is reasonable to assume for most cases that any increase in final demand is met largely through imports rather than domestic production.

## Absolute Vs. Ratio Multipliers

Multipliers may be expressed in either the absolute or ratio form. For absolute multipliers, impacts on household income, employment, etc. are based on changes in the output of an industry or the demand for a commodity, i.e., output or demand is the causal factor generating change. For ratio multipliers ( also known as traditional multipliers), the causal

variable is different for each impact with both cause and impact being measured in the same dimensions. These ratio multipliers show, for example, the total impact on household income in the economy resulting from a change in the contribution to household income by an industry, the total impact on employment in the economy as a result of a change in employment in a given industry, etc. An example should clarify the conceptual difference between these two forms of multipliers. Table 2 (line 4) gives an absolute household income multiplier of .344 for mines, quarries and oil wells, meaning that a $1 million change in the industry's output would change total household income in Alberta by $0.344 million. Table 4 (line 4) shows the comparable ratio multiplier - 2.682 - for household income for the same industry. Thus, if the industry adds $1 million to household income (for example, through higher payrolls), total household income in the province would increase by $2.682 million. As the example illustrates, for absolute multipliers the cause (a change in output) is not in the same terms as the impact (change in household income); for ratio multipliers both cause and impact are expressed in the same terms (i.e., household income in this example).

In comparing absolute and ratio multipliers, it should also be noted:

1. Gross output multipliers are identical for both (e.g., the figure 1.982 is found in both Tables 2 and 4 for mines, quarries and oil wells). As discussed earlier, the impacts measured by absolute multipliers are based on changes in output. The nature of ratio multipliers (i.e., both cause and effect measured in the same dimensions) means that the gross output ratio multiplier also is based on a change in output. Thus, in the absolute and ratio forms, identical gross output multipliers result.

2. Because the causal factors for ratio multipliers (i.e., change in household income, employment, etc.) are essentially industry related, such multipliers are not meaningful for commodities. Absolute multipliers, however, are available for both industries and commodities.

## USING MULTIPLIERS

This section briefly illustrates the use of multipliers as a component (on either the cost or benefit side) in the decision making process. More detailed studies can be done as the user becomes more familiar with multiplier analysis.

Choosing the correct multiplier(s) to use in a particular situation requires deciding:

(a) How the impact of the economic change is to be measured, i.e., on income, employment, gross domestic product and/or gross output.

(b) What multiplier table(s) to use. This requires deciding upon simple or total multipliers, absolute or ratio form, with or without leakages, for industries or commodities and the level of detail for the industry or commodity. To simplify this decision process, it should be remembered:

  (i) Applications based on simple multipliers are limited for most users. The examples in this publication deal only with total multipliers.

  (ii) Multipliers which take leakages into account are more reflective of the actual situation and thus more frequently used than the "without leakage" multipliers.

  (iii) When the causal factor is a change in production output, industry multipliers are used. When it is decided to measure the impact of a change in the demand for a commodity, commodity multipliers are the appropriate ones.

The following examples are only a small indication of the use of multiplier analysis. They illustrate how different multipliers can be used.

### Economic Impact of A New Plant

Suppose a chemical plant costing $100 million to construct and with a projected annual output of $20 million is built in Alberta. Both the temporary construction impact and the

longer run production impact should be considered. For such analyses, Tables 2 and 6 (depending on the industry detail required) provide the appropriate multipliers because:

(a) Absolute (rather than ratio) multipliers for industries (rather than commodities) are used when the changes ($100 million and $20 million) are expressed as industry output.

(b) To reflect the actual situations, the "with leakage" multipliers are appropriate.

Table 6 provides the multipliers to assess both the construction and production impacts. The construction industry also appears in Table 2. However, as pointed out in the Cautionary Notes section, when the same industry appears in both the major and detailed tables, the multipliers from the latter should be used.

From Table 6, line 29, the economic impact (combined direct, indirect and induced) of the $100 million (m) construction phase would be an increase of:

| | | |
|---|---|---|
| - | household income | 0.717 x $100m = $ 71.7m |
| - | GDP at factor cost | 0.965 x $100m = $ 96.5m |
| - | gross output | 2.748 x $100m = $ 274.8m |
| - | employment (is based on per $10,000 and is expressed in 1984 dollars) | 0.212 x 9,000* = 1,908 person years employment |

* The deflated $1984 value of $100m is $90m thus the employment factor is

$$\$\ \frac{90{,}000{,}000}{\$\ 10{,}000} = 9{,}000.$$

The above figures provide the temporary impact on the economy during the construction phase. A similar set of calculations using Table 6, line 27 for the chemical industries would be required to determine the impact of the plant's longer run, ongoing annual production operations. The total impact would be the combined construction and ongoing operation of the proposed plant.

Sometimes it may be more practical to express a new development in terms of the jobs and/or payroll to be created instead of output. Suppose the new chemical plant construction had been described not in terms of output (i.e., $100 million) but rather in terms of employment of 765 people. To ascertain the economic impact in such a situation (i.e., when the factors of production, rather than output, are specified) ratio, rather than absolute, industry multipliers are used.

From Table 8, line 29, construction employment would have generated a total of 1,908 (765 x 2.493) person years of employment.

It is interesting to note that the nature of ratio multipliers (i.e., industry contribution and total economic impact are being measured in terms of the same variable) means the impact on jobs can be determined without discounting to 1984, which is necessary for the absolute multipliers.

**Export Promotion**

Suppose expanded marketing efforts result in an increase of $100 million of coal exports from Alberta. The impact of an increase in the demand for a commodity would normally be measured by commodity multipliers. When looking specifically at the impacts resulting from changes in the level of exports, the assumption is made that all goods exported have been produced in Alberta. In multiplier analysis, this means there can be no leakages at the final demand stage (although leakages at the intermediate demand level are appropriate).

The commodity multipliers (with leakages) in this publication have been derived to include leakages at the final demand stage (as well as at the intermediate demand level). This makes them unsuitable for measuring the impact of changes in the export levels of commodities. However, it should be noted that suitable commodity multipliers (that do not allow final demand leakages) can be derived and are available from the Economic Models group of the Alberta Bureau of Statistics on request.

Since the industry multipliers in this publication are derived on the basis of intermediate demand leakages only, is there any situation in which they can be used for analysis of export changes ? In the case where the commodity in question is produced only by one industry, the industry multipliers can be used since they are identical to the commodity multipliers derived with the same assumptions of leakages.

Since coal comes from one industry (coal mines), the impact of the $100 million increase in exports can be determined from Table 6, line 4. For example, in this case, household income will increase by $58.3 million, G.D.P. by $105.6 million and gross ouput by $240.4 million.

## CAUTIONARY NOTES

Before using the multipliers presented in this publication, readers should review the following cautionary notes.

1. The multiplier values are derived from a simple static input-output model, which assumes capacity exists to meet an increase in demand. If an increase in demand can only be met by increasing capacity through an investment in new plant and equipment, the actual impact on the economy would be higher than that indicated by the multipliers in this publication.

2. The multipliers have not been adjusted for price changes since 1984. For ratio multipliers this does not create a problem since the method of deriving them results in their not being influenced significantly by price changes. The absolute multipliers for household income, G.D.P. and gross output also are not significantly affected, assuming that price changes for these factors parallel those for commodities and industry output. This is not an unreasonable assumption in most cases. It is the absolute employment multipliers where the effect of price changes is significant. Adjustments for price changes have to be made before employing these multipliers (as illustrated in the examples presented in the Using Multipliers section).

3. For an industry (e.g., petroleum and coal products) which is highly vertically integrated and uses arbitrary valuation methods in transferring product from one level of the industry to another (e.g., crude petroleum transferred to refineries), the ratio multipliers for income, employment and G.D.P. can be distorted and should be used with caution. If the value attached to the product being transferred from one level to another in the integrated industry is arbitrarily high, the resulting ratio multipliers (because of the way these multipliers are calculated) overstate the impact.

4. Multipliers can be derived with or without leakages. For the former, the leakages may be at the intermediate demand stage or at both the intermediate and final demand stages.[2] When using multipliers with leakages, one must always be aware of what leakages have been included so as not to misuse the multipliers. With a view to making them applicable to as many different situations as possible, the industry with leakage multipliers in this publication have been derived to include intermediate demand leakages only while the commodity with leakage multipliers include both intermediate and final demand leakages. As pointed out in the Using the Multipliers Section, one area where such commodity multipliers are not appropriate is when considering the impact of increased exports.

5. Some industries (e.g., agriculture, forestry, communications) are common to both the major industry and detailed industry multiplier tables. Similarly, some commodities (e.g., live animals, forestry products, beverages) are found in both the major and detailed commodity multiplier tables. In such cases, the multiplier values are somewhat different between the two levels of aggregation. Where this occurs, the multipliers for the more detailed level should be used. Multipliers based on a larger, more detailed input-output table are considered to be more accurate because the larger the table the easier it is to take into account the interdependencies among industries.

6. When comparing differences between multipliers with and without leakages, although either absolute or ratio multipliers can be used (depending on how the information is specified), the calculated differences are not necessarily directly

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[2] To produce goods and services, industries require input goods and services. For example, the agriculture industry uses gasoline, fertilizers, machinery, etc. to produce grain, live animals and other agricultural products. When the goods and services are being demanded for the production process (e.g., gasoline, fertilizers, etc. in the above example), this is known as intermediate demand. When goods and services are being demanded by final consumers (including government) for ultimate consumption (and not as part of the production process) this is final demand.

comparable between the two forms of multipliers. As indicated in point 5 above, leakages are different between industry and commodity multipliers. The former have been derived to include only leakages at the intermediate demand stage while commodity multipliers include leakages at both the intermediate and final demand stages.

# TABLES

## TOTAL MULTIPLIERS BY INDUSTRY

# TABLE 1

## TOTAL MULTIPLIERS (ABSOLUTE FORM, WITHOUT LEAKAGES) BY MAJOR INDUSTRY, 1984

| INDUSTRY | HOUSEHOLD INCOME | G.D.P. AT FACTOR COST | EMPLOY-MENT | GROSS OUTPUT |
|---|---|---|---|---|
| 1 AGRICULTURE | 1.028 | 1.857 | 0.452 | 4.970 |
| 2 FORESTRY | 1.039 | 1.757 | 0.288 | 4.450 |
| 3 FISHING, HUNTING AND TRAPPING | 2.179 | 3.345 | 0.659 | 8.978 |
| 4 MINES, QUARRIES AND OIL WELLS | 0.568 | 1.390 | 0.147 | 2.969 |
| 5 MANUFACTURING | 0.984 | 1.797 | 0.314 | 5.062 |
| 6 CONSTRUCTION | 1.159 | 1.836 | 0.355 | 4.954 |
| 7 TRADE | 1.387 | 1.995 | 0.534 | 4.702 |
| 8 TRANSPORTATION AND STORAGE | 1.072 | 1.804 | 0.359 | 4.457 |
| 9 COMMUNICATIONS | 1.086 | 1.806 | 0.325 | 3.951 |
| 10 UTILITIES | 0.790 | 1.876 | 0.187 | 3.198 |
| 11 FINANCE, INSURANCE AND REAL ESTATE | 0.766 | 1.497 | 0.161 | 3.018 |
| 12 COMM., BUS. AND PERSONAL SERVICES | 1.321 | 1.953 | 0.508 | 4.625 |
| 13 DUMMY INDUSTRY I (1) | 1.043 | 1.778 | 0.355 | 5.762 |
| 14 DUMMY INDUSTRY II (2) | 1.043 | 1.706 | 0.361 | 5.248 |
| 15 TRANSPORTATION MARGINS (3) | 1.070 | 1.805 | 0.358 | 5.447 |
| 16 HOUSEHOLDS (4) | 0.768 | 1.297 | 0.255 | 4.070 |

SEE FOOTNOTE(S) AT END OF TOTAL MULTIPLIERS TABLES

# TABLE 2

## TOTAL MULTIPLIERS (ABSOLUTE FORM, WITH LEAKAGES) BY MAJOR INDUSTRY, 1984

| INDUSTRY | HOUSEHOLD INCOME | G.D.P. AT FACTOR COST | EMPLOY-MENT | GROSS OUTPUT |
|---|---|---|---|---|
| 1 AGRICULTURE | 0.546 | 0.995 | 0.287 | 2.692 |
| 2 FORESTRY | 0.514 | 1.018 | 0.150 | 2.551 |
| 3 FISHING, HUNTING AND TRAPPING | 1.368 | 1.922 | 0.394 | 5.308 |
| 4 MINES, QUARRIES AND OIL WELLS | 0.344 | 0.985 | 0.079 | 1.982 |
| 5 MANUFACTURING | 0.514 | 0.956 | 0.159 | 2.866 |
| 6 CONSTRUCTION | 0.666 | 0.966 | 0.194 | 2.672 |
| 7 TRADE | 1.001 | 1.318 | 0.408 | 2.971 |
| 8 TRANSPORTATION AND STORAGE | 0.653 | 1.075 | 0.221 | 2.597 |
| 9 COMMUNICATIONS | 0.766 | 1.247 | 0.220 | 2.513 |
| 10 UTILITIES | 0.573 | 1.495 | 0.117 | 2.231 |
| 11 FINANCE, INSURANCE AND REAL ESTATE | 0.559 | 1.135 | 0.094 | 2.101 |
| 12 COMM., BUS. AND PERSONAL SERVICES | 0.933 | 1.276 | 0.380 | 2.888 |
| 13 DUMMY INDUSTRY I (1) | 0.304 | 0.460 | 0.114 | 2.193 |
| 14 DUMMY INDUSTRY II (2) | 0.443 | 0.686 | 0.159 | 2.636 |
| 15 TRANSPORTATION MARGINS (3) | 0.276 | 0.455 | 0.093 | 2.095 |
| 16 HOUSEHOLDS (4) | 0.370 | 0.602 | 0.125 | 2.282 |

SEE FOOTNOTE(S) AT END OF TOTAL MULTIPLIERS TABLES

## TABLE 3

**TOTAL MULTIPLIERS (RATIO FORM, WITHOUT LEAKAGES) BY MAJOR INDUSTRY, 1984**

| INDUSTRY | HOUSEHOLD INCOME | G.D.P. AT FACTOR COST | EMPLOY-MENT | GROSS OUTPUT |
|---|---|---|---|---|
| 1 AGRICULTURE | 4.833 | 4.536 | 2.839 | 4.970 |
| 2 FORESTRY | 3.323 | 3.326 | 5.626 | 4.450 |
| 3 FISHING, HUNTING AND TRAPPING | 3.381 | 4.609 | 4.374 | 8.978 |
| 4 MINES, QUARRIES AND OIL WELLS | 4.433 | 2.379 | 6.599 | 2.969 |
| 5 MANUFACTURING | 5.929 | 7.872 | 6.893 | 5.062 |
| 6 CONSTRUCTION | 3.415 | 4.803 | 4.168 | 4.954 |
| 7 TRADE | 2.153 | 2.764 | 1.826 | 4.702 |
| 8 TRANSPORTATION AND STORAGE | 3.220 | 3.382 | 3.080 | 4.457 |
| 9 COMMUNICATIONS | 2.239 | 2.278 | 2.563 | 3.951 |
| 10 UTILITIES | 2.222 | 1.715 | 3.754 | 3.198 |
| 11 FINANCE, INSURANCE AND REAL ESTATE | 2.171 | 1.886 | 5.861 | 3.018 |
| 12 COMM., BUS. AND PERSONAL SERVICES | 2.265 | 2.779 | 1.928 | 4.625 |

## TABLE 4

**TOTAL MULTIPLIERS (RATIO FORM, WITH LEAKAGES) BY MAJOR INDUSTRY, 1984**

| INDUSTRY | HOUSEHOLD INCOME | G.D.P. AT FACTOR COST | EMPLOY-MENT | GROSS OUTPUT |
|---|---|---|---|---|
| 1 AGRICULTURE | 2.568 | 2.432 | 1.806 | 2.692 |
| 2 FORESTRY | 1.965 | 1.928 | 2.918 | 2.551 |
| 3 FISHING, HUNTING AND TRAPPING | 2.122 | 2.648 | 2.614 | 5.308 |
| 4 MINES, QUARRIES AND OIL WELLS | 2.682 | 1.687 | 3.545 | 1.982 |
| 5 MANUFACTURING | 3.098 | 4.188 | 3.503 | 2.866 |
| 6 CONSTRUCTION | 1.963 | 2.526 | 2.280 | 2.672 |
| 7 TRADE | 1.553 | 1.827 | 1.395 | 2.971 |
| 8 TRANSPORTATION AND STORAGE | 1.962 | 2.015 | 1.900 | 2.597 |
| 9 COMMUNICATIONS | 1.578 | 1.573 | 1.735 | 2.513 |
| 10 UTILITIES | 1.612 | 1.367 | 2.348 | 2.231 |
| 11 FINANCE, INSURANCE AND REAL ESTATE | 1.585 | 1.430 | 3.413 | 2.101 |
| 12 COMM., BUS. AND PERSONAL SERVICES | 1.600 | 1.817 | 1.444 | 2.888 |

# TABLE 5

**TOTAL MULTIPLIERS (ABSOLUTE FORM, WITHOUT LEAKAGES) BY DETAILED INDUSTRY, 1984**

| INDUSTRY | HOUSEHOLD INCOME | G.D.P. AT FACTOR COST | EMPLOYMENT | GROSS OUTPUT |
|---|---|---|---|---|
| 1 AGRICULTURE | 1.046 | 1.854 | 0.477 | 4.958 |
| 2 FORESTRY | 1.080 | 1.769 | 0.315 | 4.459 |
| 3 FISHING, HUNTING AND TRAPPING | 2.252 | 3.378 | 0.717 | 9.064 |
| 4 COAL MINES | 0.972 | 1.690 | 0.291 | 3.987 |
| 5 PETROLEUM AND GAS WELLS | 0.539 | 1.357 | 0.142 | 2.825 |
| 6 OTHER MINES AND QUARRIES | 1.045 | 1.745 | 0.337 | 4.179 |
| 7 SERVICES INCIDENTAL TO MINING | 1.197 | 1.843 | 0.372 | 4.741 |
| 8 MEAT AND POULTRY PRODUCTS INDUSTRY | 1.141 | 1.892 | 0.470 | 6.059 |
| 9 DAIRY FACTORIES | 1.162 | 1.922 | 0.453 | 5.609 |
| 10 MISC. FOOD INDUSTRIES | 1.127 | 1.870 | 0.440 | 5.602 |
| 11 BEVERAGE INDUSTRIES | 1.070 | 1.743 | 0.351 | 4.761 |
| 12 RUBBER INDUSTRIES | 1.568 | 2.063 | 0.516 | 6.406 |
| 13 LEATHER INDUSTRIES | 1.331 | 1.964 | 0.532 | 5.585 |
| 14 TEXTILE INDUSTRIES | 1.090 | 1.771 | 0.381 | 4.959 |
| 15 CLOTHING INDUSTRIES | 1.100 | 1.785 | 0.437 | 4.524 |
| 16 WOOD INDUSTRIES | 1.316 | 1.929 | 0.429 | 5.326 |
| 17 FURNITURE AND FIXTURES INDUSTRIES | 1.517 | 2.069 | 0.539 | 5.884 |
| 18 PAPER AND ALLIED INDUSTRIES | 0.970 | 1.679 | 0.301 | 4.447 |
| 19 PRINTING AND PUBLISHING | 1.197 | 1.850 | 0.414 | 4.619 |
| 20 PRIMARY METAL INDUSTRIES | 0.870 | 1.472 | 0.262 | 4.067 |
| 21 METAL FABRICATING INDUSTRIES | 1.235 | 1.839 | 0.407 | 4.941 |
| 22 MACHINERY INDUSTRIES | 1.163 | 1.800 | 0.380 | 4.711 |
| 23 TRANSPORTATION EQUIPMENT INDUSTRIES | 1.325 | 1.930 | 0.468 | 4.977 |
| 24 ELECTRICAL PRODUCTS INDUSTRIES | 1.424 | 2.000 | 0.514 | 5.581 |
| 25 NON-METALLIC MINERAL PRODUCTS INDUSTRIES | 1.147 | 1.792 | 0.359 | 4.765 |
| 26 PETROLEUM AND COAL PRODUCTS INDUSTRIES | 0.794 | 1.774 | 0.215 | 4.782 |
| 27 CHEMICAL AND CHEMICAL PRODUCTS INDUSTRIES | 0.788 | 1.538 | 0.235 | 4.219 |
| 28 MISC. MANUFACTURING INDUSTRIES | 1.194 | 1.843 | 0.426 | 5.003 |
| 29 CONSTRUCTION INDUSTRY | 1.313 | 1.906 | 0.418 | 5.168 |
| 30 WHOLESALE AND RETAIL TRADE INDUSTRY | 1.426 | 2.005 | 0.564 | 4.719 |
| 31 TRANSPORTATION AND STORAGE INDUSTRY | 1.103 | 1.820 | 0.380 | 4.489 |
| 32 COMMUNICATIONS INDUSTRY | 1.127 | 1.818 | 0.354 | 3.970 |
| 33 UTILITIES | 0.845 | 1.907 | 0.215 | 3.296 |
| 34 FINANCE, INSURANCE AND REAL ESTATE | 0.790 | 1.505 | 0.178 | 3.033 |
| 35 HEALTH AND HOSPITAL INDUSTRY | 1.636 | 2.170 | 0.513 | 5.019 |
| 36 BUSINESS SERVICES INDUSTRY | 1.482 | 2.059 | 0.488 | 4.767 |
| 37 ACCOMMODATION AND FOOD SERVICES INDUSTRY | 1.271 | 1.891 | 0.585 | 4.765 |
| 38 OTHER PERSONAL AND MISC. SERVICES INDUSTRY | 1.222 | 1.860 | 0.560 | 4.334 |
| 39 DUMMY INDUSTRY I (1) | 1.177 | 1.793 | 0.421 | 5.674 |
| 40 DUMMY INDUSTRY II (2) | 1.106 | 1.726 | 0.406 | 5.225 |
| 41 TRANSPORTATION MARGINS (3) | 1.101 | 1.822 | 0.379 | 5.480 |
| 42 HOUSEHOLDS (4) | 0.813 | 1.310 | 0.292 | 4.103 |

SEE FOOTNOTE(S) AT END OF TOTAL MULTIPLIERS TABLES

# TABLE 6

**TOTAL MULTIPLIERS (ABSOLUTE FORM, WITH LEAKAGES) BY DETAILED INDUSTRY, 1984**

| INDUSTRY | HOUSEHOLD INCOME | G.D.P. AT FACTOR COST | EMPLOY-MENT | GROSS OUTPUT |
|---|---|---|---|---|
| 1 AGRICULTURE | 0.561 | 1.037 | 0.299 | 2.836 |
| 2 FORESTRY | 0.613 | 1.017 | 0.152 | 2.556 |
| 3 FISHING, HUNTING AND TRAPPING | 1.362 | 1.940 | 0.402 | 5.410 |
| 4 COAL MINES | 0.583 | 1.056 | 0.159 | 2.404 |
| 5 PETROLEUM AND GAS WELLS | 0.313 | 0.978 | 0.069 | 1.921 |
| 6 OTHER MINES AND QUARRIES | 0.644 | 1.098 | 0.196 | 2.557 |
| 7 SERVICES INCIDENTAL TO MINING | 0.704 | 1.054 | 0.202 | 2.725 |
| 8 MEAT AND POULTRY PRODUCTS INDUSTRY | 0.541 | 0.882 | 0.238 | 3.361 |
| 9 DAIRY FACTORIES | 0.570 | 0.928 | 0.228 | 3.014 |
| 10 MISC. FOOD INDUSTRIES | 0.514 | 0.843 | 0.210 | 2.886 |
| 11 BEVERAGE INDUSTRIES | 0.500 | 0.829 | 0.154 | 2.356 |
| 12 RUBBER INDUSTRIES | 0.751 | 0.713 | 0.240 | 2.804 |
| 13 LEATHER INDUSTRIES | 0.702 | 0.937 | 0.302 | 2.857 |
| 14 TEXTILE INDUSTRIES | 0.440 | 0.689 | 0.158 | 2.057 |
| 15 CLOTHING INDUSTRIES | 0.528 | 0.864 | 0.233 | 2.072 |
| 16 WOOD INDUSTRIES | 0.735 | 1.006 | 0.229 | 2.945 |
| 17 FURNITURE AND FIXTURES INDUSTRIES | 0.718 | 0.844 | 0.264 | 2.572 |
| 18 PAPER AND ALLIED INDUSTRIES | 0.468 | 0.860 | 0.132 | 2.325 |
| 19 PRINTING AND PUBLISHING | 0.687 | 1.017 | 0.240 | 2.476 |
| 20 PRIMARY METAL INDUSTRIES | 0.399 | 0.695 | 0.108 | 2.037 |
| 21 METAL FABRICATING INDUSTRIES | 0.627 | 0.866 | 0.204 | 2.383 |
| 22 MACHINERY INDUSTRIES | 0.549 | 0.824 | 0.174 | 2.171 |
| 23 TRANSPORTATION EQUIPMENT INDUSTRIES | 0.702 | 0.955 | 0.254 | 2.446 |
| 24 ELECTRICAL PRODUCTS INDUSTRIES | 0.582 | 0.727 | 0.219 | 2.249 |
| 25 NON-METALLIC MINERAL PRODUCTS INDUSTRIES | 0.612 | 0.908 | 0.179 | 2.526 |
| 26 PETROLEUM AND COAL PRODUCTS INDUSTRIES | 0.448 | 1.196 | 0.102 | 3.382 |
| 27 CHEMICAL AND CHEMICAL PRODUCTS INDUSTRIES | 0.388 | 0.840 | 0.103 | 2.498 |
| 28 MISC. MANUFACTURING INDUSTRIES | 0.590 | 0.837 | 0.220 | 2.347 |
| 29 CONSTRUCTION INDUSTRY | 0.717 | 0.965 | 0.212 | 2.748 |
| 30 WHOLESALE AND RETAIL TRADE INDUSTRY | 0.999 | 1.318 | 0.413 | 2.984 |
| 31 TRANSPORTATION AND STORAGE INDUSTRY | 0.648 | 1.084 | 0.221 | 2.642 |
| 32 COMMUNICATIONS INDUSTRY | 0.762 | 1.240 | 0.224 | 2.505 |
| 33 UTILITIES | 0.592 | 1.499 | 0.126 | 2.271 |
| 34 FINANCE, INSURANCE AND REAL ESTATE | 0.558 | 1.130 | 0.096 | 2.099 |
| 35 HEALTH AND HOSPITAL INDUSTRY | 1.180 | 1.440 | 0.350 | 3.161 |
| 36 BUSINESS SERVICES INDUSTRY | 1.038 | 1.354 | 0.329 | 2.998 |
| 37 ACCOMMODATION AND FOOD SERVICES INDUSTRY | 0.810 | 1.142 | 0.418 | 2.813 |
| 38 OTHER PERSONAL AND MISC. SERVICES INDUSTRY | 0.828 | 1.225 | 0.419 | 2.737 |
| 39 DUMMY INDUSTRY I (1) | 0.304 | 0.434 | 0.119 | 2.091 |
| 40 DUMMY INDUSTRY II (2) | 0.487 | 0.740 | 0.190 | 2.757 |
| 41 TRANSPORTATION MARGINS (3) | 0.273 | 0.459 | 0.093 | 2.114 |
| 42 HOUSEHOLDS (4) | 0.370 | 0.597 | 0.133 | 2.293 |

SEE FOOTNOTE(S) AT END OF TOTAL MULTIPLIERS TABLES

# TABLE 7

**TOTAL MULTIPLIERS (RATIO FORM, WITHOUT LEAKAGES) BY DETAILED INDUSTRY, 1984**

| INDUSTRY | HOUSEHOLD INCOME | G.D.P. AT FACTOR COST | EMPLOY-MENT | GROSS OUTPUT |
|---|---|---|---|---|
| 1 AGRICULTURE | 4.952 | 4.530 | 2.998 | 4.958 |
| 2 FORESTRY | 3.454 | 3.348 | 6.138 | 4.459 |
| 3 FISHING, HUNTING AND TRAPPING | 3.494 | 4.654 | 4.757 | 9.064 |
| 4 COAL MINES | 3.261 | 2.999 | 4.211 | 3.987 |
| 5 PETROLEUM AND GAS WELLS | 5.449 | 2.301 | 9.815 | 2.825 |
| 6 OTHER MINES AND QUARRIES | 3.362 | 3.110 | 4.279 | 4.179 |
| 7 SERVICES INCIDENTAL TO MINING | 3.084 | 3.464 | 4.100 | 4.741 |
| 8 MEAT AND POULTRY PRODUCTS INDUSTRY | 11.654 | 18.168 | 19.698 | 6.059 |
| 9 DAIRY FACTORIES | 6.319 | 7.703 | 9.431 | 5.609 |
| 10 MISC. FOOD INDUSTRIES | 7.739 | 9.134 | 9.949 | 5.602 |
| 11 BEVERAGE INDUSTRIES | 4.402 | 4.244 | 5.664 | 4.761 |
| 12 RUBBER INDUSTRIES | 3.775 | 13.821 | 4.065 | 6.406 |
| 13 LEATHER INDUSTRIES | 3.762 | 5.242 | 3.121 | 5.585 |
| 14 TEXTILE INDUSTRIES | 4.639 | 5.056 | 4.427 | 4.959 |
| 15 CLOTHING INDUSTRIES | 3.378 | 3.302 | 2.734 | 4.524 |
| 16 WOOD INDUSTRIES | 3.975 | 5.419 | 4.353 | 5.326 |
| 17 FURNITURE AND FIXTURES INDUSTRIES | 3.793 | 5.897 | 3.574 | 5.884 |
| 18 PAPER AND ALLIED INDUSTRIES | 4.566 | 3.870 | 6.406 | 4.447 |
| 19 PRINTING AND PUBLISHING | 2.922 | 3.260 | 2.906 | 4.619 |
| 20 PRIMARY METAL INDUSTRIES | 4.250 | 4.168 | 5.974 | 4.067 |
| 21 METAL FABRICATING INDUSTRIES | 3.412 | 4.159 | 3.664 | 4.941 |
| 22 MACHINERY INDUSTRIES | 3.585 | 3.870 | 3.954 | 4.711 |
| 23 TRANSPORTATION EQUIPMENT INDUSTRIES | 3.127 | 3.748 | 3.030 | 4.977 |
| 24 ELECTRICAL PRODUCTS INDUSTRIES | 4.273 | 5.911 | 3.938 | 5.581 |
| 25 NON-METALLIC MINERAL PRODUCTS INDUSTRIES | 3.572 | 4.340 | 4.438 | 4.765 |
| 26 PETROLEUM AND COAL PRODUCTS INDUSTRIES | 16.325 | 53.897 | 33.415 | 4.782 |
| 27 CHEMICAL AND CHEMICAL PRODUCTS INDUSTRIES | 6.606 | 5.735 | 10.070 | 4.219 |
| 28 MISC. MANUFACTURING INDUSTRIES | 3.556 | 4.380 | 3.239 | 5.003 |
| 29 CONSTRUCTION INDUSTRY | 3.869 | 4.985 | 4.908 | 5.168 |
| 30 WHOLESALE AND RETAIL TRADE INDUSTRY | 2.213 | 2.778 | 1.928 | 4.719 |
| 31 TRANSPORTATION AND STORAGE INDUSTRY | 3.311 | 3.412 | 3.266 | 4.489 |
| 32 COMMUNICATIONS INDUSTRY | 2.322 | 2.293 | 2.787 | 3.970 |
| 33 UTILITIES | 2.375 | 1.743 | 4.309 | 3.296 |
| 34 FINANCE, INSURANCE AND REAL ESTATE | 2.237 | 1.895 | 6.468 | 3.033 |
| 35 HEALTH AND HOSPITAL INDUSTRY | 2.031 | 2.616 | 2.342 | 5.019 |
| 36 BUSINESS SERVICES INDUSTRY | 2.210 | 2.688 | 2.440 | 4.767 |
| 37 ACCOMMODATION AND FOOD SERVICES INDUSTRY | 2.656 | 3.214 | 1.964 | 4.765 |
| 38 OTHER PERSONAL AND MISC. SERVICES INDUSTRY | 2.410 | 2.675 | 1.813 | 4.334 |

# TABLE 8

**TOTAL MULTIPLIERS (RATIO FORM, WITH LEAKAGES)
BY DETAILED INDUSTRY, 1984**

| INDUSTRY | HOUSEHOLD INCOME | G.D.P. AT FACTOR COST | EMPLOYMENT | GROSS OUTPUT |
|---|---|---|---|---|
| 1 AGRICULTURE | 2.655 | 2.534 | 1.882 | 2.836 |
| 2 FORESTRY | 1.962 | 1.926 | 2.974 | 2.556 |
| 3 FISHING, HUNTING AND TRAPPING | 2.113 | 2.673 | 2.670 | 5.410 |
| 4 COAL MINES | 1.955 | 1.874 | 2.303 | 2.404 |
| 5 PETROLEUM AND GAS WELLS | 3.161 | 1.658 | 4.791 | 1.921 |
| 6 OTHER MINES AND QUARRIES | 2.071 | 1.957 | 2.486 | 2.557 |
| 7 SERVICES INCIDENTAL TO MINING | 1.814 | 1.981 | 2.221 | 2.725 |
| 8 MEAT AND POULTRY PRODUCTS INDUSTRY | 5.530 | 8.470 | 9.983 | 3.361 |
| 9 DAIRY FACTORIES | 3.097 | 3.718 | 4.740 | 3.014 |
| 10 MISC. FOOD INDUSTRIES | 3.531 | 4.118 | 4.739 | 2.886 |
| 11 BEVERAGE INDUSTRIES | 2.059 | 2.018 | 2.476 | 2.356 |
| 12 RUBBER INDUSTRIES | 1.807 | 4.778 | 1.892 | 2.804 |
| 13 LEATHER INDUSTRIES | 1.985 | 2.500 | 1.773 | 2.857 |
| 14 TEXTILE INDUSTRIES | 1.872 | 1.967 | 1.831 | 2.057 |
| 15 CLOTHING INDUSTRIES | 1.622 | 1.598 | 1.456 | 2.072 |
| 16 WOOD INDUSTRIES | 2.221 | 2.827 | 2.329 | 2.945 |
| 17 FURNITURE AND FIXTURES INDUSTRIES | 1.796 | 2.405 | 1.751 | 2.572 |
| 18 PAPER AND ALLIED INDUSTRIES | 2.206 | 1.982 | 2.807 | 2.325 |
| 19 PRINTING AND PUBLISHING | 1.677 | 1.792 | 1.680 | 2.476 |
| 20 PRIMARY METAL INDUSTRIES | 1.948 | 1.968 | 2.461 | 2.037 |
| 21 METAL FABRICATING INDUSTRIES | 1.734 | 1.959 | 1.834 | 2.383 |
| 22 MACHINERY INDUSTRIES | 1.690 | 1.772 | 1.811 | 2.171 |
| 23 TRANSPORTATION EQUIPMENT INDUSTRIES | 1.658 | 1.854 | 1.645 | 2.446 |
| 24 ELECTRICAL PRODUCTS INDUSTRIES | 1.746 | 2.148 | 1.679 | 2.249 |
| 25 NON-METALLIC MINERAL PRODUCTS INDUSTRIES | 1.906 | 2.199 | 2.213 | 2.526 |
| 26 PETROLEUM AND COAL PRODUCTS INDUSTRIES | 9.212 | 36.320 | 15.796 | 3.382 |
| 27 CHEMICAL AND CHEMICAL PRODUCTS INDUSTRIES | 3.253 | 3.134 | 4.409 | 2.498 |
| 28 MISC. MANUFACTURING INDUSTRIES | 1.756 | 1.990 | 1.671 | 2.347 |
| 29 CONSTRUCTION INDUSTRY | 2.113 | 2.524 | 2.493 | 2.748 |
| 30 WHOLESALE AND RETAIL TRADE INDUSTRY | 1.551 | 1.825 | 1.413 | 2.984 |
| 31 TRANSPORTATION AND STORAGE INDUSTRY | 1.945 | 2.032 | 1.901 | 2.642 |
| 32 COMMUNICATIONS INDUSTRY | 1.571 | 1.564 | 1.763 | 2.505 |
| 33 UTILITIES | 1.665 | 1.370 | 2.534 | 2.271 |
| 34 FINANCE, INSURANCE AND REAL ESTATE | 1.580 | 1.423 | 3.493 | 2.099 |
| 35 HEALTH AND HOSPITAL INDUSTRY | 1.465 | 1.735 | 1.600 | 3.161 |
| 36 BUSINESS SERVICES INDUSTRY | 1.548 | 1.768 | 1.647 | 2.998 |
| 37 ACCOMMODATION AND FOOD SERVICES INDUSTRY | 1.694 | 1.940 | 1.402 | 2.813 |
| 38 OTHER PERSONAL AND MISC. SERVICES INDUSTRY | 1.632 | 1.762 | 1.359 | 2.737 |

# TABLES

## TOTAL MULTIPLIERS BY COMMODITY

# TABLE 9

**TOTAL MULTIPLIERS (ABSOLUTE FORM, WITHOUT LEAKAGES)
BY MAJOR COMMODITY, 1984**

| COMMODITY | HOUSEHOLD INCOME | G.D.P. AT FACTOR COST | EMPLOYMENT | GROSS OUTPUT |
|---|---|---|---|---|
| 1 LIVE ANIMALS | 1.028 | 1.857 | 0.452 | 4.970 |
| 2 GRAINS | 1.028 | 1.857 | 0.452 | 4.970 |
| 3 OTHER AGRICULTURAL PRODUCTS | 1.028 | 1.856 | 0.451 | 4.969 |
| 4 FISHING AND TRAPPING PRODUCTS | 2.179 | 3.345 | 0.659 | 8.978 |
| 5 FORESTRY PRODUCTS | 1.037 | 1.766 | 0.299 | 4.495 |
| 6 MINERAL FUELS | 0.569 | 1.390 | 0.147 | 2.974 |
| 7 NON-METALLIC MINERALS | 0.585 | 1.406 | 0.154 | 3.049 |
| 8 PRODUCTS RELATING TO MINES | 0.568 | 1.390 | 0.147 | 2.969 |
| 9 MEAT, FISH AND DAIRY PRODUCTS | 0.990 | 1.801 | 0.319 | 5.055 |
| 10 FRUIT, VEG., FEED & MISC. FOOD PROD. | 1.004 | 1.807 | 0.324 | 5.044 |
| 11 BEVERAGES | 0.984 | 1.797 | 0.314 | 5.061 |
| 12 RUBBER, LEATHER, PLASTIC FAB. PROD. | 0.987 | 1.799 | 0.316 | 5.059 |
| 13 TEXTILE PRODUCTS | 0.988 | 1.799 | 0.316 | 5.058 |
| 14 KNITTED PRODUCTS AND CLOTHING | 0.991 | 1.801 | 0.318 | 5.055 |
| 15 LUMBER, SAWMILL, OTHER WOOD PROD. | 0.999 | 1.804 | 0.322 | 5.048 |
| 16 FURNITURE AND FIXTURES | 0.986 | 1.798 | 0.315 | 5.060 |
| 17 PAPER AND PAPER PRODUCTS | 0.988 | 1.799 | 0.316 | 5.058 |
| 18 PRINTING AND PUBLISHING | 0.985 | 1.797 | 0.314 | 5.061 |
| 19 PRIMARY METAL PRODUCTS | 0.986 | 1.798 | 0.315 | 5.060 |
| 20 METAL FABRICATING PRODUCTS | 0.988 | 1.799 | 0.316 | 5.058 |
| 21 MACHINERY AND EQUIPMENT | 0.948 | 1.759 | 0.301 | 4.839 |
| 22 AUTOS, TRUCKS, OTHER TRANS. EQUIP. | 1.009 | 1.804 | 0.327 | 4.954 |
| 23 ELECTRICAL AND COMMUNICATIONS PROD. | 1.022 | 1.807 | 0.325 | 4.809 |
| 24 NON-METALLIC MINERAL PRODUCTS | 0.985 | 1.797 | 0.314 | 5.061 |
| 25 PETROLEUM AND COAL PRODUCTS | 0.872 | 1.687 | 0.269 | 4.496 |
| 26 CHEMICALS AND CHEMICAL PRODUCTS | 0.988 | 1.801 | 0.322 | 5.051 |
| 27 MISC. MANUFACTURED PRODUCTS | 1.001 | 1.805 | 0.323 | 5.046 |
| 28 CONSTRUCTION | 1.159 | 1.836 | 0.355 | 4.954 |
| 29 WHOLESALE AND RETAIL TRADE | 1.373 | 1.988 | 0.526 | 4.706 |
| 30 TRANSPORTATION AND STORAGE | 1.070 | 1.805 | 0.358 | 4.447 |
| 31 COMMUNICATION SERVICES | 1.066 | 1.806 | 0.325 | 3.951 |
| 32 OTHER UTILITIES | 0.792 | 1.875 | 0.188 | 3.218 |
| 33 REAL ESTATE RENT | 0.776 | 1.506 | 0.167 | 3.055 |
| 34 FINANCE, INSURANCE AND REAL ESTATE | 0.755 | 1.492 | 0.161 | 3.018 |
| 35 BUSINESS, PERSONAL & OTHER MISC. SVCS | 1.299 | 1.937 | 0.493 | 4.575 |
| 36 DUMMY COMMODITY I (1) | 1.043 | 1.778 | 0.355 | 5.762 |
| 37 DUMMY COMMODITY II (2) | 1.043 | 1.706 | 0.361 | 5.248 |
| 38 TRANSPORTATION MARGINS (3) | 1.070 | 1.805 | 0.358 | 5.447 |
| 39 HOUSEHOLD SERVICES (4) | 0.768 | 1.297 | 0.255 | 4.070 |

SEE FOOTNOTES(S) AT END OF TOTAL MULTIPLIERS TABLES

# TABLE 10

**TOTAL MULTIPLIERS (ABSOLUTE FORM, WITH LEAKAGES)
BY MAJOR COMMODITY, 1984**

| COMMODITY | HOUSEHOLD INCOME | G.D.P. AT FACTOR COST | EMPLOY-MENT | GROSS OUTPUT |
|---|---|---|---|---|
| 1 LIVE ANIMALS | 0.456 | 0.831 | 0.240 | 2.247 |
| 2 GRAINS | 0.433 | 0.789 | 0.228 | 2.132 |
| 3 OTHER AGRICULTURAL PRODUCTS | 0.421 | 0.768 | 0.221 | 2.077 |
| 4 FISHING AND TRAPPING PRODUCTS | 0.129 | 0.181 | 0.037 | 0.501 |
| 5 FORESTRY PRODUCTS | 0.556 | 0.930 | 0.145 | 2.347 |
| 6 MINERAL FUELS | 0.343 | 0.984 | 0.079 | 1.981 |
| 7 NON-METALLIC MINERALS | 0.110 | 0.310 | 0.026 | 0.635 |
| 8 PRODUCTS RELATING TO MINES | 0.339 | 0.972 | 0.078 | 1.955 |
| 9 MEAT, FISH AND DAIRY PRODUCTS | 0.388 | 0.717 | 0.123 | 2.135 |
| 10 FRUIT, VEG., FEED & MISC. FOOD PROD. | 0.203 | 0.367 | 0.065 | 1.081 |
| 11 BEVERAGES | 0.273 | 0.507 | 0.085 | 1.521 |
| 12 RUBBER, LEATHER, PLASTIC FAB. PROD. | 0.096 | 0.177 | 0.030 | 0.530 |
| 13 TEXTILE PRODUCTS | 0.043 | 0.079 | 0.013 | 0.236 |
| 14 KNITTED PRODUCTS AND CLOTHING | 0.030 | 0.056 | 0.009 | 0.166 |
| 15 LUMBER, SAWMILL, OTHER WOOD PROD. | 0.268 | 0.488 | 0.085 | 1.446 |
| 16 FURNITURE AND FIXTURES | 0.128 | 0.237 | 0.040 | 0.710 |
| 17 PAPER AND PAPER PRODUCTS | 0.109 | 0.202 | 0.034 | 0.603 |
| 18 PRINTING AND PUBLISHING | 0.280 | 0.521 | 0.087 | 1.561 |
| 19 PRIMARY METAL PRODUCTS | 0.115 | 0.214 | 0.036 | 0.641 |
| 20 METAL FABRICATING PRODUCTS | 0.120 | 0.222 | 0.037 | 0.662 |
| 21 MACHINERY AND EQUIPMENT | 0.072 | 0.138 | 0.022 | 0.396 |
| 22 AUTOS, TRUCKS, OTHER TRANS. EQUIP. | 0.020 | 0.036 | 0.006 | 0.103 |
| 23 ELECTRICAL AND COMMUNICATIONS PROD. | 0.038 | 0.067 | 0.012 | 0.181 |
| 24 NON-METALLIC MINERAL PRODUCTS | 0.208 | 0.386 | 0.065 | 1.155 |
| 25 PETROLEUM AND COAL PRODUCTS | 0.416 | 0.856 | 0.123 | 2.333 |
| 26 CHEMICALS AND CHEMICAL PRODUCTS | 0.213 | 0.396 | 0.069 | 1.177 |
| 27 MISC. MANUFACTURED PRODUCTS | 0.065 | 0.118 | 0.021 | 0.348 |
| 28 CONSTRUCTION | 0.666 | 0.966 | 0.194 | 2.672 |
| 29 WHOLESALE AND RETAIL TRADE | 0.882 | 1.171 | 0.358 | 2.655 |
| 30 TRANSPORTATION AND STORAGE | 0.276 | 0.455 | 0.093 | 1.095 |
| 31 COMMUNICATION SERVICES | 0.758 | 1.235 | 0.218 | 2.487 |
| 32 OTHER UTILITIES | 0.436 | 1.135 | 0.089 | 1.706 |
| 33 REAL ESTATE RENT | 0.511 | 1.029 | 0.089 | 1.918 |
| 34 FINANCE, INSURANCE AND REAL ESTATE | 0.405 | 0.834 | 0.069 | 1.551 |
| 35 BUSINESS, PERSONAL & OTHER MISC. SVCS | 0.655 | 0.907 | 0.263 | 2.044 |
| 36 DUMMY COMMODITY I (1) | 0.304 | 0.460 | 0.114 | 2.193 |
| 37 DUMMY COMMODITY II (2) | 0.443 | 0.686 | 0.159 | 2.636 |
| 38 TRANSPORTATION MARGINS (3) | 0.276 | 0.455 | 0.093 | 2.095 |
| 39 HOUSEHOLD SERVICES (4) | 0.370 | 0.602 | 0.125 | 2.282 |

SEE FOOTNOTES(S) AT END OF TOTAL MULTIPLIERS TABLES

# TABLE 11

**TOTAL MULTIPLIERS (ABSOLUTE FORM, WITHOUT LEAKAGES)
BY DETAILED COMMODITY, 1984**

| COMMODITY | HOUSEHOLD INCOME | G.D.P. AT FACTOR COST | EMPLOY-MENT | GROSS OUTPUT |
|---|---|---|---|---|
| 1 LIVE ANIMALS | 1.046 | 1.854 | 0.477 | 4.958 |
| 2 GRAINS | 1.046 | 1.854 | 0.477 | 4.958 |
| 3 OTHER AGRICULTURAL PRODUCTS | 1.046 | 1.854 | 0.476 | 4.960 |
| 4 FISHING AND TRAPPING PRODUCTS | 2.252 | 3.378 | 0.717 | 9.064 |
| 5 FORESTRY PRODUCTS | 1.086 | 1.780 | 0.328 | 4.511 |
| 6 COAL | 0.972 | 1.690 | 0.291 | 3.987 |
| 7 CRUDE MINERAL OILS | 0.539 | 1.357 | 0.142 | 2.825 |
| 8 NATURAL GAS | 0.541 | 1.360 | 0.143 | 2.841 |
| 9 NON-METALLIC MINERALS | 0.671 | 1.458 | 0.193 | 3.199 |
| 10 SERVICES INCIDENTAL TO MINING | 1.197 | 1.843 | 0.372 | 4.741 |
| 11 MEAT PRODUCTS | 1.143 | 1.892 | 0.471 | 6.004 |
| 12 DAIRY PRODUCTS | 1.163 | 1.922 | 0.453 | 5.608 |
| 13 FISH PRODUCTS | 1.127 | 1.870 | 0.440 | 5.602 |
| 14 FRUITS AND VEGETABLES PREPARATIONS | 1.139 | 1.876 | 0.444 | 5.554 |
| 15 FEEDS | 1.131 | 1.871 | 0.442 | 5.589 |
| 16 FLOUR MILL PRODUCTS | 1.127 | 1.870 | 0.440 | 5.602 |
| 17 BREAKFAST CEREAL & BAKERY PROD. | 1.184 | 1.896 | 0.464 | 5.432 |
| 18 SUGAR & MOLASSES | 1.127 | 1.870 | 0.440 | 5.602 |
| 19 MISC. FOOD PRODUCTS | 1.139 | 1.875 | 0.445 | 5.565 |
| 20 BEVERAGES | 1.070 | 1.743 | 0.352 | 4.763 |
| 21 TIRES AND TUBES | 1.563 | 2.061 | 0.517 | 6.352 |
| 22 OTHER RUBBER PRODUCTS | 1.563 | 2.060 | 0.514 | 6.390 |
| 23 PLASTIC FABRICATED PRODUCTS | 1.153 | 1.810 | 0.405 | 4.924 |
| 24 LEATHER & LEATHER PRODUCTS | 1.305 | 1.944 | 0.521 | 5.464 |
| 25 TEXTILE PRODUCTS | 1.096 | 1.774 | 0.384 | 4.956 |
| 26 KNITTED PRODUCTS & CLOTHING | 1.114 | 1.795 | 0.441 | 4.572 |
| 27 LUMBER & TIMBER | 1.322 | 1.933 | 0.437 | 5.289 |
| 28 VENEER & PLYWOOD | 1.315 | 1.928 | 0.429 | 5.324 |
| 29 OTHER WOOD PRODUCTS | 1.314 | 1.926 | 0.430 | 5.302 |
| 30 FURNITURE & FIXTURES | 1.479 | 2.042 | 0.521 | 5.779 |
| 31 PULP | 0.970 | 1.679 | 0.301 | 4.447 |
| 32 PAPER & PAPER PRODUCTS | 1.017 | 1.713 | 0.327 | 4.534 |
| 33 PRINTING & PUBLISHING | 1.198 | 1.850 | 0.415 | 4.620 |
| 34 IRON & STEEL PRODUCTS | 0.901 | 1.502 | 0.275 | 4.138 |
| 35 NON FERROUS METAL PROD. | 0.871 | 1.473 | 0.263 | 4.071 |
| 36 BOILERS, TANKS & PLATES | 1.218 | 1.830 | 0.401 | 4.888 |
| 37 FABRICATED STRUCTURAL METAL PROD. | 1.222 | 1.827 | 0.402 | 4.907 |
| 38 OTHER METAL FABRICATED PROD. | 1.227 | 1.833 | 0.406 | 4.914 |

# TABLE 11

**TOTAL MULTIPLIERS (ABSOLUTE FORM, WITHOUT LEAKAGES)
BY DETAILED COMMODITY, 1984 – CONTINUED**

| COMMODITY | HOUSEHOLD INCOME | G.D.P. AT FACTOR COST | EMPLOYMENT | GROSS OUTPUT |
|---|---|---|---|---|
| 39 AGRICULTURAL MACHINERY | 1.186 | 1.817 | 0.394 | 4.734 |
| 40 OTHER INDUSTRIAL MACHINERY | 1.128 | 1.771 | 0.367 | 4.603 |
| 41 MOTOR VEHICLES | 1.320 | 1.926 | 0.466 | 4.967 |
| 42 MOTOR VEHICLE PARTS | 1.279 | 1.882 | 0.439 | 4.931 |
| 43 OTHER TRANSPORTATION EQUIPMENT | 1.203 | 1.870 | 0.420 | 4.704 |
| 44 APPLIANCES & RECEIVERS, HOUSEHOLD | 1.376 | 1.970 | 0.524 | 4.959 |
| 45 OTHER ELEC. PRODUCTS | 1.350 | 1.954 | 0.476 | 5.179 |
| 46 CEMENT & CONCRETE PRODUCTS | 1.147 | 1.792 | 0.359 | 4.765 |
| 47 OTHER NON-METALLIC MINERAL PROD. | 1.149 | 1.794 | 0.361 | 4.767 |
| 48 GASOLINE | 0.794 | 1.774 | 0.215 | 4.782 |
| 49 FUEL OIL | 0.794 | 1.774 | 0.215 | 4.782 |
| 50 LUBRICATING OIL & GREASE | 0.794 | 1.774 | 0.215 | 4.781 |
| 51 OTHER PETROLEUM & COAL PROD. | 0.600 | 1.450 | 0.161 | 3.265 |
| 52 FERTILIZERS | 1.021 | 1.824 | 0.454 | 4.888 |
| 53 PHARMACEUTICALS | 0.818 | 1.560 | 0.250 | 4.243 |
| 54 INORGANIC CHEMICALS | 0.803 | 1.531 | 0.240 | 4.197 |
| 55 ORGANIC CHEMICALS | 0.788 | 1.538 | 0.235 | 4.220 |
| 56 INDUSTRIAL CHEMICAL PROD. | 0.808 | 1.529 | 0.242 | 4.198 |
| 57 OTHER CHEMICAL PROD. | 0.850 | 1.595 | 0.271 | 4.432 |
| 58 SCIENCE & LABORATORY EQUIP. | 1.200 | 1.846 | 0.429 | 4.999 |
| 59 MISC. MANUFACTURED PRODUCTS | 1.157 | 1.810 | 0.406 | 4.867 |
| 60 CONSTRUCTION | 1.313 | 1.906 | 0.418 | 5.168 |
| 61 WHOLESALE & RETAIL TRADE | 1.410 | 1.995 | 0.558 | 4.711 |
| 62 TRANSPORTATION & STORAGE | 1.101 | 1.822 | 0.379 | 4.480 |
| 63 RADIO & TELEVISION BROADCASTING | 1.127 | 1.818 | 0.354 | 3.970 |
| 64 TELEPHONE & TELEGRAPH | 1.127 | 1.818 | 0.354 | 3.970 |
| 65 POSTAL SERVICES | 1.127 | 1.818 | 0.354 | 3.970 |
| 66 ELECTRIC POWER | 0.845 | 1.907 | 0.215 | 3.296 |
| 67 OTHER UTILITIES | 0.842 | 1.901 | 0.215 | 3.368 |
| 68 REAL ESTATE RENT | 0.799 | 1.513 | 0.184 | 3.071 |
| 69 FINANCE, INSURANCE & REAL ESTATE | 0.775 | 1.496 | 0.176 | 3.024 |
| 70 HEALTH & HOSPITAL SERVICES | 1.636 | 2.170 | 0.513 | 5.019 |
| 71 BUSINESS SERVICES | 1.472 | 2.053 | 0.485 | 4.751 |
| 72 ACCOMMODATION & MEALS | 1.273 | 1.893 | 0.583 | 4.757 |
| 73 OTHER PERSONAL & MISC. SERVICES | 1.192 | 1.837 | 0.518 | 4.257 |
| 74 DUMMY COMMODITY I (1) | 1.177 | 1.793 | 0.421 | 5.674 |
| 75 DUMMY COMMODITY II (2) | 1.106 | 1.726 | 0.406 | 5.225 |
| 76 TRANSPORTATION MARGINS (3) | 1.101 | 1.822 | 0.379 | 5.480 |
| 77 HOUSEHOLD SERVICES (4) | 0.813 | 1.310 | 0.292 | 4.103 |

SEE FOOTNOTE(S) AT END OF TOTAL MULTIPLIERS TABLES

# TABLE 12

**TOTAL MULTIPLIERS (ABSOLUTE FORM, WITH LEAKAGES)
BY DETAILED COMMODITY, 1984**

| COMMODITY | HOUSEHOLD INCOME | G.D.P. AT FACTOR COST | EMPLOYMENT | GROSS OUTPUT |
|---|---|---|---|---|
| 1 LIVE ANIMALS | 0.468 | 0.866 | 0.250 | 2.368 |
| 2 GRAINS | 0.444 | 0.822 | 0.237 | 2.247 |
| 3 OTHER AGRICULTURAL PRODUCTS | 0.432 | 0.799 | 0.230 | 2.188 |
| 4 FISHING AND TRAPPING PRODUCTS | 0.128 | 0.183 | 0.038 | 0.510 |
| 5 FORESTRY PRODUCTS | 0.563 | 0.933 | 0.150 | 2.361 |
| 6 COAL | 0.583 | 1.056 | 0.159 | 2.403 |
| 7 CRUDE MINERAL OILS | 0.313 | 0.978 | 0.069 | 1.921 |
| 8 NATURAL GAS | 0.312 | 0.974 | 0.069 | 1.922 |
| 9 NON-METALLIC MINERALS | 0.125 | 0.316 | 0.032 | 0.658 |
| 10 SERVICES INCIDENTAL TO MINING | 0.694 | 1.039 | 0.199 | 2.688 |
| 11 MEAT PRODUCTS | 0.431 | 0.701 | 0.190 | 2.622 |
| 12 DAIRY PRODUCTS | 0.407 | 0.662 | 0.163 | 2.151 |
| 13 FISH PRODUCTS | 0.000 | 0.000 | 0.000 | 0.000 |
| 14 FRUITS AND VEGETABLES PREPARATIONS | 0.039 | 0.063 | 0.016 | 0.209 |
| 15 FEEDS | 0.440 | 0.718 | 0.180 | 2.439 |
| 16 FLOUR MILL PRODUCTS | 0.290 | 0.476 | 0.118 | 1.629 |
| 17 BREAKFAST CEREAL & BAKERY PROD. | 0.234 | 0.360 | 0.096 | 1.119 |
| 18 SUGAR & MOLASSES | 0.399 | 0.655 | 0.163 | 2.242 |
| 19 MISC. FOOD PRODUCTS | 0.122 | 0.197 | 0.050 | 0.661 |
| 20 BEVERAGES | 0.266 | 0.440 | 0.082 | 1.251 |
| 21 TIRES AND TUBES | 0.060 | 0.058 | 0.019 | 0.222 |
| 22 OTHER RUBBER PRODUCTS | 0.017 | 0.016 | 0.005 | 0.063 |
| 23 PLASTIC FABRICATED PRODUCTS | 0.210 | 0.309 | 0.076 | 0.873 |
| 24 LEATHER & LEATHER PRODUCTS | 0.029 | 0.040 | 0.013 | 0.119 |
| 25 TEXTILE PRODUCTS | 0.037 | 0.058 | 0.013 | 0.171 |
| 26 KNITTED PRODUCTS & CLOTHING | 0.031 | 0.050 | 0.014 | 0.122 |
| 27 LUMBER & TIMBER | 0.325 | 0.444 | 0.104 | 1.276 |
| 28 VENEER & PLYWOOD | 0.128 | 0.176 | 0.040 | 0.514 |
| 29 OTHER WOOD PRODUCTS | 0.447 | 0.611 | 0.140 | 1.777 |
| 30 FURNITURE & FIXTURES | 0.176 | 0.212 | 0.064 | 0.641 |
| 31 PULP | 0.082 | 0.151 | 0.023 | 0.408 |
| 32 PAPER & PAPER PRODUCTS | 0.108 | 0.186 | 0.033 | 0.502 |
| 33 PRINTING & PUBLISHING | 0.375 | 0.554 | 0.131 | 1.349 |
| 34 IRON & STEEL PRODUCTS | 0.094 | 0.160 | 0.026 | 0.465 |
| 35 NON FERROUS METAL PROD. | 0.085 | 0.148 | 0.023 | 0.434 |
| 36 BOILERS, TANKS & PLATES | 0.311 | 0.437 | 0.100 | 1.192 |
| 37 FABRICATED STRUCTURAL METAL PROD. | 0.277 | 0.306 | 0.090 | 1.063 |
| 38 OTHER METAL FABRICATED PROD. | 0.078 | 0.108 | 0.025 | 0.297 |

# TABLE 12

**TOTAL MULTIPLIERS (ABSOLUTE FORM, WITH LEAKAGES) BY DETAILED COMMODITY, 1984 – CONTINUED**

| COMMODITY | HOUSEHOLD INCOME | G.D.P. AT FACTOR COST | EMPLOY-MENT | GROSS OUTPUT |
|---|---|---|---|---|
| 39 AGRICULTURAL MACHINERY | 0.021 | 0.031 | 0.007 | 0.081 |
| 40 OTHER INDUSTRIAL MACHINERY | 0.090 | 0.139 | 0.028 | 0.362 |
| 41 MOTOR VEHICLES | 0.015 | 0.021 | 0.005 | 0.053 |
| 42 MOTOR VEHICLE PARTS | 0.033 | 0.045 | 0.012 | 0.119 |
| 43 OTHER TRANSPORTATION EQUIPMENT | 0.041 | 0.063 | 0.015 | 0.157 |
| 44 APPLIANCES & RECEIVERS, HOUSEHOLD | 0.011 | 0.015 | 0.004 | 0.036 |
| 45 OTHER ELEC. PRODUCTS | 0.055 | 0.074 | 0.019 | 0.201 |
| 46 CEMENT & CONCRETE PRODUCTS | 0.294 | 0.436 | 0.086 | 1.213 |
| 47 OTHER NON-METALLIC MINERAL PROD. | 0.149 | 0.221 | 0.044 | 0.614 |
| 48 GASOLINE | 0.423 | 1.130 | 0.096 | 3.196 |
| 49 FUEL OIL | 0.403 | 1.075 | 0.091 | 3.041 |
| 50 LUBRICATING OIL & GREASE | 0.273 | 0.729 | 0.062 | 2.063 |
| 51 OTHER PETROLEUM & COAL PROD. | 0.276 | 0.818 | 0.062 | 1.791 |
| 52 FERTILIZERS | 0.348 | 0.652 | 0.180 | 1.796 |
| 53 PHARMACEUTICALS | 0.004 | 0.008 | 0.001 | 0.023 |
| 54 INORGANIC CHEMICALS | 0.228 | 0.477 | 0.061 | 1.412 |
| 55 ORGANIC CHEMICALS | 0.309 | 0.669 | 0.082 | 1.988 |
| 56 INDUSTRIAL CHEMICAL PROD. | 0.150 | 0.310 | 0.040 | 0.919 |
| 57 OTHER CHEMICAL PROD. | 0.068 | 0.137 | 0.020 | 0.415 |
| 58 SCIENCE & LABORATORY EQUIP. | 0.104 | 0.148 | 0.039 | 0.412 |
| 59 MISC. MANUFACTURED PRODUCTS | 0.053 | 0.077 | 0.019 | 0.214 |
| 60 CONSTRUCTION | 0.717 | 0.965 | 0.212 | 2.748 |
| 61 WHOLESALE & RETAIL TRADE | 0.878 | 1.167 | 0.364 | 2.654 |
| 62 TRANSPORTATION & STORAGE | 0.273 | 0.459 | 0.093 | 1.114 |
| 63 RADIO & TELEVISION BROADCASTING | 0.751 | 1.221 | 0.220 | 2.466 |
| 64 TELEPHONE & TELEGRAPH | 0.760 | 1.237 | 0.223 | 2.498 |
| 65 POSTAL SERVICES | 0.730 | 1.187 | 0.214 | 2.398 |
| 66 ELECTRIC POWER | 0.548 | 1.386 | 0.117 | 2.100 |
| 67 OTHER UTILITIES | 0.274 | 0.694 | 0.058 | 1.087 |
| 68 REAL ESTATE RENT | 0.509 | 1.024 | 0.091 | 1.917 |
| 69 FINANCE, INSURANCE & REAL ESTATE | 0.402 | 0.830 | 0.070 | 1.547 |
| 70 HEALTH & HOSPITAL SERVICES | 0.985 | 1.202 | 0.292 | 2.639 |
| 71 BUSINESS SERVICES | 0.676 | 0.885 | 0.214 | 1.959 |
| 72 ACCOMMODATION & MEALS | 0.804 | 1.132 | 0.411 | 2.779 |
| 73 OTHER PERSONAL & MISC. SERVICES | 0.434 | 0.655 | 0.206 | 1.450 |
| 74 DUMMY COMMODITY I (1) | 0.304 | 0.434 | 0.119 | 2.091 |
| 75 DUMMY COMMODITY II (2) | 0.487 | 0.740 | 0.190 | 2.757 |
| 76 TRANSPORTATION MARGINS (3) | 0.273 | 0.459 | 0.093 | 2.114 |
| 77 HOUSEHOLD SERVICES (4) | 0.370 | 0.597 | 0.133 | 2.293 |

SEE FOOTNOTE(S) AT END OF TOTAL MULTIPLIERS TABLES

## FOOTNOTES

(1) The dummy industry and commodity technique is used in input-output tables to deal with "catch-all" categories of inputs reported by establishments. For example, dummy industry I contains office supplies. Instead of finding the commodity content (paper, pencils, paper clips, etc.) of office supplies for each industry, it is estimated for one industry called "office supplies" whose output is equal to the total purchases of office supplies by all industries. Also included in dummy industry I are four other similar inputs - operating supplies, cafeteria requirements, laboratory supplies and machinery repair services.

Corresponding to each dummy industry, there is one dummy commodity. Thus, office supplies, operating supplies, cafeteria requirements, laboratory supplies and machinery repair services are included in dummy commodity I in all commodity tables.

(2) Dummy industry II includes two additional dummy industries - travel and entertainment, and advertising and promotion. Corresponding dummy commodities are included in dummy commodity II in commodity tables.

(3) The transportation margins dummy industry and commodity technique is used in input-output tables to deal with the transportation cost associated with the movement of commodities from point of production to purchasers. All such transportation costs are called transportaton margins which are paid by purchasers. It is difficult to identify these transportation costs by type of transport (e.g., air transport, rail transport, truck transport, etc.) for each commodity and for each industry. Therefore, all these transportation margins are routed through a dummy industry called "transportation margins". This dummy industry purchases all types of transport from the transportation industry and produces the dummy commodity - "transportation margin" which is allocated by commodity for each industry and final demand category.

(4) "Households" is an industry when the model is closed with respect to households to examine the feedback effects of spending the additional income generated in the production process. "Households" consists of persons, unincorporated businesses and non-profit organizations. The inputs of this industry are the commodities in the personal expenditure column. The output of this industry is "household services" which appears in commodity tables. "Household services" consist of labour and capital services provided by households.

# APPENDICES

## APPENDIX I

## DATA SOURCES

Most of the detailed data required for the calculation of multipliers are contained in 1984 Alberta Input-Output Tables. Additional data requirements and sources used are listed below.

1. Employment by Industry: To calculate employment multipliers data on employment - paid and other than paid workers - by industry are obtained from the Input-Output Division, Statistics Canada.

2. Personal Income: Data about Personal Income and Outlay components are required to close the model and to calculate household income multipliers. These data are obtained from **Alberta Economic Accounts, 1988**, (Table 7), published by the Bureau. Household income is treated as the sum of wages, salaries and supplementary labour income, military pay and allowances, net income of unincorporated business, interest, dividends and miscellaneous investment income and current transfers to persons. The distribution of the first three components by industry is available in the 1984 input-output tables. Transfers to persons fall outside the production system, thus is not included in GDP. Industrial distribution of interest, dividends, and miscellaneous investment income is obtained in two steps: (a) wherever possible, the different components of this item are allocated to industries using the worksheet details available in the personal sector of **Alberta Economic Accounts**; and (b) the remainder of the total after the first step is allocated to industries using operating surplus as an allocator.

## APPENDIX II

## METHODOLOGY

The input-output model, when used to study the effects on the economy of a change in the final demand, becomes an impact, or multiplier model. Details about deriving impact tables from input-output tables and the mathematical description of the open input-output model were provided in an earlier Bureau publication on 1974 Alberta input-output tables. This appendix presents, in non-technical terms, the methodology employed to calculate the four types of multipliers included in this report.

In simple terms, the methodology employed to derive multipliers consists of two steps: (a) deriving a total requirements table for a dollar increase in final demand, or a dollar increase in production and (b) applying direct factor coefficients to the total requirements table to obtain multipliers. The total requirements table is the basis for calculation of all multipliers. This table presents the direct and indirect effects on industry outputs of a dollar increase in final demand or a dollar increase in production. For example, a dollar increase in agricultural production creates demand for all industry outputs the agriculture industry is purchasing to produce the additional dollar of output. This necessitates an increase in the production of all those industries supplying inputs to the agriculture industry. They, in turn, increase the demand for outputs of their suppliers. This process continues until the economy reaches an equilibrium position, i.e., where supply equals demand. In this equilibrium position, the level of the agriculture industry's output is determined by the direct and indirect effects of a dollar increase in the final sales of the agriculture industry's output. All these effects can be expressed using the technology matrix B, which provides the direct requirements to produce one dollar of output of each industry. The matrix (I-B) is called the Leontief matrix, where I is an identity matrix with appropriate dimensions. The inverse of (I-B) provides the total requirements table in a simple case of an industry by industry input-output table. Each column in the inverse of (I-B) provides the direct and indirect requirements of industry outputs from one dollar increase in the final sales of the output of the industry corresponding to that column. The column sum gives the "output multiplier" for the industry corresponding to that column.

From this output base, we can move to any other category with the direct and indirect effects on industry outputs. For example, employment multipliers are calculated by multiplying the employee-output coefficients of industries with the entries in each column of the total requirements table. This basic procedure is repeated to calculate other types of multipliers. Specifically, all multiplier results presented in this report are expressed in terms of the following:

(a) **Household Income**: This is the sum of wages, salaries and supplementary labour income; military pay and allowances; net income of unincorporated business; interest, dividends and miscellaneous investment income.

(b) **GDP at factor cost**: This is the sum of wages, salaries and supplementary labour income; military pay and allowances; net income of unincorporated business; inventory valuation adjustment and operating surplus, which includes profits, investment income, and capital consumption allowances.

(c) **Employment**: This is the number of paid and non-paid workers (self employed etc.).

(d) **Gross Output**: This equals shipments adjusted for inventory change.

For items (a), (b) and (d) above, the direct coefficients are calculated by dividing each category with the industry's total output. Employment is expressed as the number of workers per $10,000 (constant 1984 dollars) of total output. This point should be remembered when interpreting the employment multipliers given in the tables.

The multiplier tables presented in this report have been derived using the closed input-output model, with and without leakages from domestic production. As stated earlier in the report, multipliers based on the open model are available on request. The distinctions between open and closed models and the method of closing the model with respect to households are explained next.

**Open Input-Output Model**

In this model, all the categories of final demand are treated outside the production system. Any autonomous increase in final demand is directed to the production system and the resulting equilibrium levels of outputs are calculated. In this model, the analysis of the level of income is incomplete, that is, the analysis stops at the point where demand and supply are satisfied. But, in fact, the productive activity by industries generates income which, in turn, stimulates additional final expenditure. This is not captured in the open model. Given a change in final demand, the open model is capable of evaluating only the direct and indirect effects on output requirements. Only part of the overall impact of a given change in final demand can be evaluated from an open model. Therefore, the multipliers derived using an open input-output model are treated as lower limits of actual multipliers and are designated as "Simple Multipliers".

**Closed Input-Output Model**

In this model, one or more of the categories of final demand are included in the production system. The closed model takes into account both the impact of demand on supply and of supply on demand. This means that the equilibrium output levels calculated from a closed model incorporate not only the outputs required to meet a given final demand, but also the outputs required to meet the change in final demand which is induced by changes in production and income. In other words, the closed model is capable of evaluating the direct, indirect and induced effects on output requirements of a change in final demand. The multipliers based on the closed model are closer to actual multipliers and are identified by the term "Total Multipliers".

As stated above, an input-output model may be closed with respect to one or more of the final demand categories. In this report, the model is closed with respect to households only. This is accomplished by adding another industry (households) column and another commodity (household services) row to the "Use" matrix. The inputs of the household industry consist of goods and services in the personal expenditure column in the final

demand matrix. The level of household industry activity is given by total personal income. Households produce labour and capital services which are purchased by other industries and governments. The household services row consists of household incomes received from each industry. Similarly, the "Production" matrix is augmented by adding a "household services" commodity column and a "households" industry row. No other industry in the "Production" matrix produces household services and "households" industry produces no other commodity except household services. These augmented "Use" and "Production" matrices are employed in deriving the multipliers based on closed models.

## APPENDIX III

### 1984 and 1979 COMPARISON

The following tables provide comparisons of the 1984 and 1979 multipliers. In most cases, the 1984 values are slightly higher than the 1979 values. The main contributing factor for this is the 1984 economy achieving more value added in the production process. GDP at factor cost constituted 52 per cent of the total production in 1984 whereas the proportion for 1979 is 49 per cent. Another contributing factor is higher induced income effect caused by more spending by persons in an economy coming out of 1982 recession.

Comparisons are made for household income, GDP at factor cost and gross output multipliers. Employment multipliers are not strictly comparable unless the output is deflated to 1979 dollars. In the case of industry multipliers, 1984 values are higher in most cases than 1979 values. It is only in the case of gross output multipliers, the change is slightly higher than the other two types. In the case of commodity multipliers (with leakages from both intermediate and final demand stages) the 1984 values are higher for majority of commodities. However, the difference is considerably reduced due to the import leakages from final demand. The significant difference to be noted is the 1984 gross output multipliers for most services are less than the 1979 values. This is due to increased imports of services in 1984.

## TOTAL MULTIPLIERS (ABSOLUTE FORM, WITH LEAKAGES) BY DETAILED INDUSTRY: A COMPARISON OF 1984 AND 1979

| INDUSTRY | HOUSEHOLD INCOME | | | G.D.P. AT FACTOR COST | | | GROSS OUTPUT | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1984 | 1979 | DIFF. | 1984 | 1979 | DIFF. | 1984 | 1979 | DIFF. |
| 1 AGRICULTURE | 0.561 | 0.648 | -0.087 | 1.037 | 1.107 | -0.070 | 2.836 | 2.656 | 0.180 |
| 2 FORESTRY | 0.613 | 0.890 | -0.277 | 1.017 | 1.070 | -0.053 | 2.556 | 3.284 | -0.728 |
| 3 FISHING, HUNTING AND TRAPPING | 1.382 | 0.487 | 0.875 | 1.940 | 1.051 | 0.889 | 5.410 | 1.983 | 3.427 |
| 4 COAL MINES | 0.583 | 0.477 | 0.106 | 1.056 | 1.018 | 0.038 | 2.404 | 2.290 | 0.114 |
| 5 PETROLEUM AND GAS WELLS | 0.313 | 0.278 | 0.035 | 0.978 | 0.948 | 0.030 | 1.921 | 1.978 | -0.057 |
| 6 OTHER MINES AND QUARRIES | 0.644 | 0.454 | 0.190 | 1.098 | 1.037 | 0.061 | 2.557 | 2.264 | 0.293 |
| 7 SERVICES INCIDENTAL TO MINING | 0.704 | 0.618 | 0.086 | 1.054 | 1.028 | 0.026 | 2.725 | 2.639 | 0.086 |
| 8 MEAT AND POULTRY PRODUCTS INDUSTRY | 0.541 | 0.617 | -0.076 | 0.882 | 0.980 | -0.098 | 3.361 | 3.424 | -0.063 |
| 9 DAIRY FACTORIES | 0.570 | 0.601 | -0.031 | 0.928 | 0.927 | 0.001 | 3.014 | 2.923 | 0.091 |
| 10 MISC. FOOD INDUSTRIES | 0.514 | 0.504 | 0.010 | 0.843 | 0.834 | 0.009 | 2.886 | 2.734 | 0.152 |
| 11 BEVERAGE INDUSTRIES | 0.500 | 0.480 | 0.020 | 0.829 | 0.884 | -0.055 | 2.358 | 2.345 | 0.011 |
| 12 RUBBER INDUSTRIES | 0.751 | 0.610 | 0.141 | 0.713 | 0.846 | -0.133 | 2.804 | 2.417 | 0.387 |
| 13 LEATHER INDUSTRIES | 0.702 | 0.606 | 0.096 | 0.937 | 0.916 | 0.021 | 2.857 | 3.348 | -0.491 |
| 14 TEXTILE INDUSTRIES | 0.440 | 0.371 | 0.069 | 0.689 | 0.648 | 0.041 | 2.057 | 1.918 | 0.139 |
| 15 CLOTHING INDUSTRIES | 0.528 | 0.522 | 0.006 | 0.864 | 0.910 | -0.046 | 2.072 | 2.077 | -0.005 |
| 16 WOOD INDUSTRIES | 0.735 | 0.613 | 0.122 | 1.006 | 0.918 | 0.088 | 2.945 | 2.636 | 0.309 |
| 17 FURNITURE AND FIXTURES INDUSTRIES | 0.718 | 0.491 | 0.227 | 0.844 | 0.881 | -0.037 | 2.572 | 2.160 | 0.412 |
| 18 PAPER AND ALLIED INDUSTRIES | 0.468 | 0.474 | -0.006 | 0.860 | 0.837 | 0.023 | 2.325 | 2.405 | -0.080 |
| 19 PRINTING AND PUBLISHING | 0.687 | 0.733 | -0.046 | 1.017 | 0.964 | 0.053 | 2.476 | 2.680 | -0.204 |
| 20 PRIMARY METAL INDUSTRIES | 0.399 | 0.361 | 0.038 | 0.695 | 0.685 | 0.010 | 2.037 | 1.952 | 0.085 |
| 21 METAL FABRICATING INDUSTRIES | 0.627 | 0.553 | 0.074 | 0.866 | 0.835 | 0.031 | 2.383 | 2.289 | 0.094 |
| 22 MACHINERY INDUSTRIES | 0.549 | 0.540 | 0.009 | 0.824 | 0.831 | -0.007 | 2.171 | 2.268 | -0.097 |
| 23 TRANSPORTATION EQUIPMENT INDUSTRIES | 0.702 | 0.548 | 0.154 | 0.955 | 0.717 | 0.238 | 2.446 | 2.304 | 0.142 |
| 24 ELECTRICAL PRODUCTS INDUSTRIES | 0.582 | 0.589 | -0.007 | 0.727 | 0.724 | 0.003 | 2.249 | 2.322 | -0.073 |
| 25 NON-METALLIC MINERAL PRODUCTS INDUSTRIES | 0.612 | 0.523 | 0.089 | 0.908 | 0.939 | -0.031 | 2.526 | 2.554 | -0.028 |
| 26 PETROLEUM AND COAL PRODUCTS INDUSTRIES | 0.448 | 0.330 | 0.118 | 1.196 | 0.905 | 0.291 | 3.382 | 2.890 | 0.492 |
| 27 CHEMICAL AND CHEMICAL PRODUCTS INDUSTRIES | 0.388 | 0.352 | 0.036 | 0.840 | 0.829 | 0.011 | 2.498 | 2.220 | 0.278 |
| 28 MISC. MANUFACTURING INDUSTRIES | 0.590 | 0.527 | 0.063 | 0.837 | 0.794 | 0.043 | 2.347 | 2.274 | 0.073 |
| 29 CONSTRUCTION INDUSTRY | 0.717 | 0.636 | 0.081 | 0.965 | 0.911 | 0.054 | 2.748 | 2.680 | 0.068 |
| 30 WHOLESALE AND RETAIL TRADE INDUSTRY | 0.999 | 0.851 | 0.148 | 1.318 | 1.228 | 0.090 | 2.984 | 2.930 | 0.054 |
| 31 TRANSPORTATION AND STORAGE INDUSTRY | 0.648 | 0.608 | 0.040 | 1.084 | 1.023 | 0.061 | 2.642 | 2.645 | -0.003 |
| 32 COMMUNICATIONS INDUSTRY | 0.762 | 0.693 | 0.069 | 1.240 | 1.244 | -0.004 | 2.505 | 2.437 | 0.068 |
| 33 UTILITIES | 0.592 | 0.650 | -0.058 | 1.499 | 1.433 | 0.066 | 2.271 | 2.430 | -0.159 |
| 34 FINANCE, INSURANCE AND REAL ESTATE | 0.558 | 0.421 | 0.137 | 1.130 | 1.027 | 0.103 | 2.099 | 1.985 | 0.114 |
| 35 HEALTH AND HOSPITAL INDUSTRY | 1.180 | 0.876 | 0.304 | 1.440 | 1.284 | 0.156 | 3.161 | 2.817 | 0.344 |
| 36 BUSINESS SERVICES INDUSTRY | 1.038 | 1.132 | -0.094 | 1.354 | 1.432 | -0.078 | 2.998 | 3.181 | -0.183 |
| 37 ACCOMMODATION AND FOOD SERVICES INDUSTRY | 0.810 | 0.741 | 0.069 | 1.142 | 1.101 | 0.041 | 2.813 | 2.888 | -0.075 |
| 38 OTHER PERSONAL AND MISC. SERVICES INDUSTRY | 0.828 | 0.630 | 0.198 | 1.225 | 1.090 | 0.135 | 2.737 | 2.654 | 0.083 |
| 39 DUMMY INDUSTRY I (1) | 0.304 | 0.324 | -0.020 | 0.434 | 0.481 | -0.047 | 2.091 | 2.229 | -0.138 |
| 40 DUMMY INDUSTRY II (2) | 0.487 | 0.442 | 0.045 | 0.740 | 0.686 | 0.054 | 2.757 | 2.735 | 0.022 |
| 41 TRANSPORTATION MARGINS (3) | 0.273 | 0.377 | -0.104 | 0.459 | 0.636 | -0.177 | 2.114 | 2.642 | -0.528 |
| 42 HOUSEHOLDS (4) | 0.370 | 0.345 | 0.025 | 0.597 | 0.597 | 0.000 | 2.293 | 2.364 | -0.071 |

SEE FOOTNOTE(S) AT END OF TOTAL MULTIPLIERS TABLES

## TOTAL MULTIPLIERS (ABSOLUTE FORM, WITH LEAKAGES) BY MAJOR COMMODITY: A COMPARISON OF 1984 AND 1979

| COMMODITY | HOUSEHOLD INCOME | | | G.D.P. AT FACTOR COST | | | GROSS OUTPUT | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1984 | 1979 | DIFF. | 1984 | 1979 | DIFF. | 1984 | 1979 | DIFF. |
| 1 LIVE ANIMALS | 0.456 | 0.569 | -0.113 | 0.831 | 0.964 | -0.133 | 2.247 | 2.270 | -0.023 |
| 2 GRAINS | 0.433 | 0.519 | -0.086 | 0.789 | 0.878 | -0.089 | 2.132 | 2.069 | 0.063 |
| 3 OTHER AGRICULTURAL PRODUCTS | 0.421 | 0.457 | -0.036 | 0.768 | 0.774 | -0.006 | 2.077 | 1.829 | 0.248 |
| 4 FISHING AND TRAPPING PRODUCTS | 0.129 | 0.076 | 0.053 | 0.181 | 0.164 | 0.017 | 0.501 | 0.308 | 0.193 |
| 5 FORESTRY PRODUCTS | 0.556 | 0.596 | -0.04 | 0.930 | 0.745 | 0.185 | 2.347 | 2.230 | 0.117 |
| 6 MINERAL FUELS | 0.343 | 0.312 | 0.031 | 0.984 | 0.955 | 0.029 | 1.981 | 2.037 | -0.056 |
| 7 NON-METALLIC MINERALS | 0.110 | 0.071 | 0.039 | 0.310 | 0.185 | 0.125 | 0.635 | 0.432 | 0.203 |
| 8 PRODUCTS RELATING TO MINES | 0.339 | 0.313 | 0.026 | 0.972 | 0.959 | 0.013 | 1.955 | 2.044 | -0.089 |
| 9 MEAT, FISH AND DAIRY PRODUCTS | 0.388 | 0.400 | -0.012 | 0.717 | 0.704 | 0.013 | 2.135 | 2.113 | 0.022 |
| 10 FRUIT, VEG., FEED & MISC. FOOD PROD. | 0.203 | 0.197 | 0.006 | 0.367 | 0.349 | 0.018 | 1.081 | 1.056 | 0.025 |
| 11 BEVERAGES | 0.273 | 0.260 | 0.013 | 0.507 | 0.462 | 0.045 | 1.521 | 1.406 | 0.115 |
| 12 RUBBER, LEATHER, PLASTIC FAB. PROD. | 0.096 | 0.087 | 0.009 | 0.177 | 0.154 | 0.023 | 0.530 | 0.469 | 0.061 |
| 13 TEXTILE PRODUCTS | 0.043 | 0.034 | 0.009 | 0.079 | 0.059 | 0.02 | 0.238 | 0.179 | 0.057 |
| 14 KNITTED PRODUCTS AND CLOTHING | 0.030 | 0.039 | -0.009 | 0.056 | 0.068 | -0.012 | 0.166 | 0.207 | -0.041 |
| 15 LUMBER, SAWMILL, OTHER WOOD PROD. | 0.268 | 0.205 | 0.063 | 0.488 | 0.363 | 0.125 | 1.446 | 1.099 | 0.347 |
| 16 FURNITURE AND FIXTURES | 0.128 | 0.150 | -0.022 | 0.237 | 0.266 | -0.029 | 0.710 | 0.809 | -0.099 |
| 17 PAPER AND PAPER PRODUCTS | 0.109 | 0.116 | -0.007 | 0.202 | 0.206 | -0.004 | 0.603 | 0.624 | -0.021 |
| 18 PRINTING AND PUBLISHING | 0.280 | 0.234 | 0.046 | 0.521 | 0.416 | 0.105 | 1.561 | 1.265 | 0.296 |
| 19 PRIMARY METAL PRODUCTS | 0.115 | 0.103 | 0.012 | 0.214 | 0.183 | 0.031 | 0.641 | 0.556 | 0.085 |
| 20 METAL FABRICATING PRODUCTS | 0.120 | 0.145 | -0.025 | 0.222 | 0.256 | -0.034 | 0.662 | 0.778 | -0.116 |
| 21 MACHINERY AND EQUIPMENT | 0.072 | 0.059 | 0.013 | 0.138 | 0.107 | 0.031 | 0.398 | 0.318 | 0.08 |
| 22 AUTOS, TRUCKS, OTHER TRANS. EQUIP. | 0.020 | 0.034 | -0.014 | 0.036 | 0.059 | -0.023 | 0.103 | 0.174 | -0.071 |
| 23 ELECTRICAL AND COMMUNICATIONS PROD. | 0.038 | 0.035 | 0.003 | 0.067 | 0.063 | 0.004 | 0.181 | 0.158 | 0.023 |
| 24 NON-METALLIC MINERAL PRODUCTS | 0.208 | 0.304 | -0.096 | 0.386 | 0.540 | -0.154 | 1.155 | 1.641 | -0.486 |
| 25 PETROLEUM AND COAL PRODUCTS | 0.416 | 0.408 | 0.008 | 0.856 | 0.850 | 0.006 | 2.333 | 2.311 | 0.022 |
| 26 CHEMICALS AND CHEMICAL PRODUCTS | 0.213 | 0.131 | 0.082 | 0.396 | 0.232 | 0.164 | 1.177 | 0.705 | 0.472 |
| 27 MISC. MANUFACTURED PRODUCTS | 0.065 | 0.044 | 0.021 | 0.118 | 0.077 | 0.041 | 0.348 | 0.231 | 0.117 |
| 28 CONSTRUCTION | 0.666 | 0.594 | 0.072 | 0.966 | 0.906 | 0.06 | 2.672 | 2.625 | 0.047 |
| 29 WHOLESALE AND RETAIL TRADE | 0.882 | 0.825 | 0.057 | 1.171 | 1.199 | -0.028 | 2.655 | 2.856 | -0.201 |
| 30 TRANSPORTATION AND STORAGE | 0.276 | 0.383 | -0.107 | 0.455 | 0.636 | -0.181 | 1.095 | 1.616 | -0.521 |
| 31 COMMUNICATION SERVICES | 0.758 | 0.663 | 0.095 | 1.235 | 1.190 | 0.045 | 2.487 | 2.320 | 0.167 |
| 32 OTHER UTILITIES | 0.436 | 0.516 | -0.08 | 1.135 | 1.145 | -0.01 | 1.706 | 1.953 | -0.247 |
| 33 REAL ESTATE RENT | 0.511 | 0.410 | 0.101 | 1.029 | 0.989 | 0.04 | 1.918 | 1.922 | -0.004 |
| 34 FINANCE, INSURANCE AND REAL ESTATE | 0.405 | 0.351 | 0.054 | 0.834 | 0.867 | -0.033 | 1.551 | 1.672 | -0.121 |
| 35 BUSINESS, PERSONAL & OTHER MISC. SVCS | 0.655 | 0.642 | 0.013 | 0.907 | 0.977 | -0.07 | 2.044 | 2.328 | -0.284 |
| 36 DUMMY COMMODITY I (1) | 0.304 | 0.316 | -0.012 | 0.460 | 0.483 | -0.023 | 2.193 | 2.250 | -0.057 |
| 37 DUMMY COMMODITY II (2) | 0.443 | 0.429 | 0.014 | 0.686 | 0.702 | -0.016 | 2.636 | 2.714 | -0.078 |
| 38 TRANSPORTATION MARGINS (3) | 0.276 | 0.383 | -0.107 | 0.455 | 0.636 | -0.181 | 2.095 | 2.616 | -0.521 |
| 39 HOUSEHOLD SERVICES (4) | 0.370 | 0.344 | 0.026 | 0.602 | 0.599 | 0.003 | 2.282 | 2.343 | -0.061 |

SEE FOOTNOTES(S) AT END OF TOTAL MULTIPLIERS TABLES

## APPENDIX IV

## INDUSTRY AGGREGATION PARAMETERS

With 1980 Standard Industrial Classification (SIC), Canadian System of National Accounts (SNA) worksheet level industries increased to 216 from 190 under 1970 SIC. The Bureau's major and detailed industry groupings are based on 1980 worksheet level industries. This appendix includes the following:

(1) SNA industry codes at worksheet level in terms of 1980 SIC.

(2) The Bureau's major industry aggregation in terms of 1980 worksheet level numbers.

(3) The Bureau's detailed industry aggregation in terms of 1980 worksheet level numbers.

Commodity aggregations remain basically the same as in the past. Although they are not provided in this appendix, they are available upon request.

## INDUSTRY CODES AT THE WORKSHEET LEVEL (W)
## IN TERMS OF 1980 SIC

| NO. | INDUSTRY TITLE – W | 1980 SIC |
|---|---|---|
| 1 | Agriculture, livestock | 011, 012, 021 |
| 2 | Agriculture, fieldcrop | 013-017, 022, 023 |
| 3 | Fishing & trapping industries | 031-033 |
| 4 | Logging & forestry industries | 0411, 0412, 0511 |
| 5 | Gold mines | 0611 |
| 6 | Other metal mines | 0612-0616, 0619 |
| 7 | Iron mines | 0617 |
| 8 | Asbestos mines | 0621 |
| 9 | Potash mines | 0624 |
| 10 | Salt mines | 0625 |
| 11 | Misc. non-metal mines exc. coal | 0622, 0623, 0629 |
| 12 | Coal mines | 063 |
| 13 | Crude petroleum & natural gas | 071 |
| 14 | Quarry & sand pit industries | 081, 082 |
| 15 | Service related to mineral extract | 091, 092 |
| 16 | Meat & meat products (exc. poultry) | 1011 |
| 17 | Poultry products industry | 1012 |
| 18 | Fish products industry | 102 |
| 19 | Fruit and vegetable industries | 103 |
| 20 | Dairy products industries | 104 |
| 21 | Flour & cereal food industries | 1051, 1052 |
| 22 | Feed industry | 1053 |
| 23 | Vegetable oil mills (exc. corn oil) | 106 |
| 24 | Biscuit industry | 1071 |
| 25 | Bread & other bakery products ind. | 1072 |
| 26 | Cane & beet sugar industry | 1081 |
| 27 | Sugar confectionery industries | 1082, 1083 |
| 28 | Tea and coffee industry | 1091 |
| 29 | Misc. food products industries nec | 1092-1099 |
| 30 | Soft drink industry | 111 |
| 31 | Distillery products industry | 112 |
| 32 | Brewery products industry | 113 |
| 33 | Wine industry | 114 |
| 34 | Tobacco products industries | 121, 122 |
| 35 | Rubber products industries | 151-159 |
| 36 | Foamed & expanded plastic products | 161 |
| 37 | Plastic pipe & pipe fittings ind. | 162 |
| 38 | Plastic film and sheeting industry | 163 |
| 39 | Plastic bag industry | 1691 |
| 40 | Other plastic products ind. nec | 1699 |
| 41 | Leather tanneries | 1711 |
| 42 | Footwear industry | 1712 |
| 43 | Misc. leather & allied prod. ind. | 1713, 1719 |
| 44 | Man-made fibre & filament yarn ind. | 181 |
| 45 | Other spun yarn & woven cloth ind. | 1829 |
| 46 | Wool yarn & woven cloth industry | 1821 |
| 47 | Broad knitted fabric industry | 183 |
| 48 | Misc. textile products industries | 191, 193, 1991 1993-1995, 1999 |
| 49 | Contract textile dyeing & finishing | 1992 |
| 50 | Carpet, mat & rug industry | 192 |
| 51 | Men's and boy's clothing industries | 243 |
| 52 | Women's clothing industries | 244 |
| 53 | Children's clothing industry | 245 |
| 54 | Misc. clothing & apparel industries | 2491-2493, 2495-2499 |
| 55 | Hosiery industry | 2494 |
| 56 | Sawmills, planing & shingle mills | 251 |
| 57 | Veneer and plywood industries | 252 |
| 58 | Pre-fab. wooden bldg. & cabinet | 2541, 2542 |
| 59 | Door, window & other millwork ind. | 2543, 2549 |
| 60 | Wooden box & coffin industries | 256, 258 |
| 61 | Particle & wafer board industries | 2592, 2593 |
| 62 | Misc. wood industries | 2591, 2599 |
| 63 | Household furniture industries | 261 |
| 64 | Office furniture industries | 264 |
| 65 | Other furniture & fixture ind. | 269 |
| 66 | Pulp industry | 2711 |
| 67 | Newsprint industry | 2712 |
| 68 | Paperboard, bldg. board & oth. paper | 2713-2719 |
| 69 | Asphalt roofing industry | 272 |
| 70 | Paper box & bag industries | 273 |
| 71 | Other converted paper products ind. | 279 |
| 72 | Commercial printing industries | 281 |
| 73 | Publishing industries | 283 |
| 74 | Combined publishing & printing ind. | 284 |

## INDUSTRY CODES AT THE WORKSHEET LEVEL (W) IN TERMS OF 1980 SIC – CONTINUED

| NO. | INDUSTRY TITLE – W | 1980 SIC |
|---|---|---|
| 75 | Platemaking, typesetting & bindery | 282 |
| 76 | Ferro-alloy & steel foundries | 2911-2912 |
| 77 | Other primary steel industries | 2919 |
| 78 | Steel pipe & tube industry | 292 |
| 79 | Iron foundries | 294 |
| 80 | Non-ferrous smelting & refining ind. | 295 |
| 81 | Aluminum rolling, casting, extruding | 296 |
| 82 | Copper rolling, casting & extruding | 297 |
| 83 | Other metal rolling, casting etc. | 299 |
| 84 | Power boiler & heat exchanger ind. | 301 |
| 85 | Pre-eng. metal bldg. (exc. portable) | 3023 |
| 86 | Fabricated structural metal ind. nec | 3021, 3022, 3029 |
| 87 | Ornamental & arch. metal prod. ind. | 303 |
| 88 | Stamped, pressed & coated metals | 304 |
| 89 | Wire and wire products industries | 305 |
| 90 | Hardware, tool & cutlery industries | 306 |
| 91 | Heating equipment industry | 307 |
| 92 | Machine shops industry | 308 |
| 93 | Other metal fabricating industries | 309 |
| 94 | Agriculture implement industry | 311 |
| 95 | Commercial refrigeration equipment | 312 |
| 96 | Compressor & turbine industries | 3191, 3194 |
| 97 | Construction & mining machinery | 3192 |
| 98 | Sawmill & other machinery ind. nec | 3193, 3199 |
| 99 | Aircraft & aircraft parts industry | 321 |
| 100 | Motor vehicle industry | 323 |
| 101 | Truck, bus body & trailer industry | 324 |
| 102 | Motor vehicle engine & parts ind. | 3251 |
| 103 | Motor vehicle wiring assemblies | 3252 |
| 104 | Motor vehicle stampings industry | 3253 |
| 105 | Motor vehicle steering & suspension | 3254 |
| 106 | Motor vehicle wheel & brake ind. | 3255 |
| 107 | Motor vehicle plastic parts ind. | 3256 |
| 108 | Motor vehicle fabric accessories | 3257 |
| 109 | Other motor vehicle access. & parts | 3259 |
| 110 | Railroad rolling stock industry | 326 |
| 111 | Shipbuilding and repair industry | 327 |
| 112 | Misc. transportation equipment ind. | 328, 329 |
| 113 | Small electrical appliance industry | 331 |
| 114 | Major appliances (elec. & non-elec.) | 332 |
| 115 | Electric lighting industries | 333 |
| 116 | Record players, radio & tv receiver | 334 |
| 117 | Telecommunication equipment ind. | 3351 |
| 118 | Electronic parts & components ind. | 3352 |
| 119 | Other electronic equipment ind. | 3359 |
| 120 | Electronic computers & peripherals | 3361 |
| 121 | Misc. office, business machines | 3362-3369 |
| 122 | Electrical transformer industry | 3371 |
| 123 | Misc. electrical industrial equip. | 3372-3379 |
| 124 | Communications, energy wire & cable | 338 |
| 125 | Battery industry | 3391 |
| 126 | Misc. electrical product industries | 3392-3399 |
| 127 | Clay products industries | 351 |
| 128 | Cement industry | 352 |
| 129 | Concrete products industries | 354 |
| 130 | Ready-mix concrete industry | 355 |
| 131 | Glass & glass products industries | 356 |
| 132 | Non-metal mineral insulation ind. | 3594 |
| 133 | Misc. non-metallic mineral products | 357, 358, 3591-3593, 3599 |
| 134 | Refined petroleum & coal products | 361, 369 |
| 135 | Industrial inorganic chemicals nec | 3711 |
| 136 | Industrial organic chemicals nec | 3712 |
| 137 | Agricultural chemical industries | 372 |
| 138 | Plastic & synthetic resin industry | 373 |
| 139 | Pharmaceutical & medicine industry | 374 |
| 140 | Paint and varnish industry | 375 |
| 141 | Soap & cleaning compounds industry | 376 |
| 142 | Toilet preparations industry | 377 |
| 143 | Other chemical products industries | 379 |
| 144 | Indicating & recording instruments | 3911 |
| 145 | Other scientific & prof. equipment | 3912-3914 |
| 146 | Jewellery & precious metal ind. | 392 |
| 147 | Sporting goods industry | 3931 |
| 148 | Toys and games industry | 3932 |
| 149 | Sign and display industry | 397 |

## INDUSTRY CODES AT THE WORKSHEET LEVEL (W) IN TERMS OF 1980 SIC – CONTINUED

| NO. | INDUSTRY TITLE – W | 1980 SIC |
|---|---|---|
| 150 | Floor tile, linoleum, coated fabric | 3993 |
| 151 | Musical instrument sound recording | 3994 |
| 152 | Misc. manufactured products nec | 3991, 3992, 3999 |
| 153 | Repair construction | 401-449 |
| 154 | Residential construction | 401-449 |
| 155 | Non-residential bldg. construction | 401-449 |
| 156 | Road, highway & airstrip const. | 401-449 |
| 157 | Gas & oil facility construction | 401-449 |
| 158 | Dams & irrigation projects | 401-449 |
| 159 | Railway & telephone telegraph const. | 401-449 |
| 160 | Other engineering construction | 401-449 |
| 161 | Construction, other activities | 401-449 |
| 162 | Air transport & services incidental | 451, 452 |
| 163 | Railway transport & rel. services | 453 |
| 164 | Water transport & rel. services | 454, 455 |
| 165 | Truck transport industries | 456 |
| 166 | Urban transit system industry | 4571 |
| 167 | Interurban & rural transit systems | 4572 |
| 168 | Taxicab industry | 4581 |
| 169 | Misc. transportation industries | 4573-4575, 4589 |
| 170 | Other services incid. to transport | 4592, 4599, 996, 9991 |
| 171 | Highway & bridge maintenance ind. | 4591 |
| 172 | Natural gas pipeline transport ind. | 4611 |
| 173 | Crude oil & other pipeline transp. | 4612, 4619 |
| 174 | Storage and warehousing industries | 471, 479 |
| 175 | Radio & television broadcasting ind. | 4811-4813 |
| 176 | Cable television industry | 4814 |
| 177 | Telecommunication carriers & other | 482, 483 |
| 178 | Postal service industry | 4841 |
| 179 | Electric power systems industry | 491 |
| 180 | Gas distribution systems industry | 492 |
| 181 | Other utility industries nec | 499 |
| 182 | Wholesale trade industries | 501-599 |
| 183 | Retail trade industries | 601-692 |
| 184 | Banks & oth. deposit accepting inst. | 701, 702, 709 |
| 185 | Trust/deposit accepting mortgage co. | 703, 704 |
| 186 | Credit unions | 705 |
| 187 | Other finance & real estate ind. | 711-729, 741-743 7499, 7511, 7512, 759, 761 |
| 188 | Insurance industries | 731, 732, 733 |
| 189 | Govt. royalties on nat. resources | 7495 |
| 190 | Owner occupied dwellings | 7513 |
| 191 | Computer & related services | 772 |
| 192 | Professional business services | 773, 775, 776 |
| 193 | Advertising services | 774 |
| 194 | Misc. business services | 771, 777, 779 |
| 195 | Educational services industries | 851-859 |
| 196 | Hospitals | 861 |
| 197 | Homes for personal & nursing care | 8621 |
| 198 | Other health and social services | 863, 865, 866, 8671, 8679, 868, 8691-8693, 8699 |
| 199 | Accommodation service industries | 911-914 |
| 200 | Food & beverage service industries | 921, 922 |
| 201 | Motion picture & video prod. dist. | 961 |
| 202 | Motion picture exhibition | 962 |
| 203 | Theatre, sports & rec. services | 963, 9641, 9642, 965, 969 |
| 204 | Race tracks and gambling operations | 9643, 9644, 966 |
| 205 | Laundries & cleaners | 972 |
| 206 | Other personal services | 971, 973, 979 |
| 207 | Photographers | 993 |
| 208 | Bus ass./mach. car leasing/oth. serv. | 982, 983, 991, 992, 9999, 4842 |
| 209 | Other repair & maintenance services | 994, 995 |
| 210 | Operating supplies | Fictive |
| 211 | Office supplies | Fictive |
| 212 | Cafeteria supplies | Fictive |
| 213 | Laboratory supplies | Fictive |
| 214 | Travel & entertainment | Fictive |
| 215 | Advertising & promotion | Fictive |
| 216 | Transportation margins | Fictive |

Source: Statistics Canada, Catalogue No. 15-201, 1989.

## MAJOR INDUSTRY AGGREGATION IN TERMS OF WORKSHEET LEVEL NUMBERS

| MAJOR INDUSTRY NUMBER | INDUSTRY TITLE | WORKSHEET LEVEL NUMBER |
|---|---|---|
| 1 | Agriculture | 1 – 2 |
| 2 | Forestry | 4 |
| 3 | Fishing, Hunting and Trapping | 3 |
| 4 | Mines, Quarries and Oil Wells | 5 – 15 |
| 5 | Manufacturing | 16 – 152 |
| 6 | Construction | 153 – 161 |
| 7 | Trade | 182 – 183 |
| 8 | Transportation and Storage | 162 – 174 |
| 9 | Communications | 175 – 178 |
| 10 | Utilities | 179 – 181 |
| 11 | Finance, Insurance and Real Estate | 184 – 190 |
| 12 | Comm., Bus. and Personal Services | 191 – 209 |
| 13 | Dummy Industry I | 210 – 213 |
| 14 | Dummy Industry II | 214 – 215 |
| 15 | Transportation Margins | 216 |

## DETAILED INDUSTRY AGGREGATION IN TERMS OF WORKSHEET LEVEL NUMBERS

| DETAILED INDUSTRY NUMBER | INDUSTRY TITLE | WORKSHEET LEVEL NUMBER |
|---|---|---|
| 1 | Agriculture | 1 - 2 |
| 2 | Forestry | 4 |
| 3 | Fishing, Hunting and Trapping | 3 |
| 4 | Coal Mines | 12 |
| 5 | Petroleum and Gas Wells | 13 |
| 6 | Other Mines and Quarries | 5 - 11, 14 |
| 7 | Services Incidental to Mining | 15 |
| 8 | Meat and Poultry Products Industry | 16 - 17 |
| 9 | Dairy Factories | 20 |
| 10 | Misc. Food Industries | 18, 19, 21 - 29 |
| 11 | Beverage Industries | 30 - 33 |
| 12 | Rubber Industries | 35 |
| 13 | Leather Industries | 41 - 43 |
| 14 | Textile Industries | 44 - 46, 48 - 50 |
| 15 | Clothing Industries | 47, 51 - 55 |
| 16 | Wood Industries | 56 - 62 |
| 17 | Furniture and Fixtures Industries | 63 - 65 |
| 18 | Paper and Allied Industries | 66 - 71 |
| 19 | Printing and Publishing | 72 - 75 |
| 20 | Primary Metal Industries | 76 - 83 |
| 21 | Metal Fabricating Industries | 84 - 93 |
| 22 | Machinery Industries | 94 - 98, 120, 121 |
| 23 | Transportation Equipment Industries | 99 - 112 |
| 24 | Electrical Products Industries | 113 - 119, 122 - 126 |
| 25 | Non-Metallic Mineral Products Industries | 127 - 133 |
| 26 | Petroleum and Coal Products Industries | 134 |
| 27 | Chemical and Chemical Products Industries | 135 - 143 |
| 28 | Misc. Manufacturing Industries | 34, 36 - 40, 144 - 152 |
| 29 | Construction Industry | 153 - 161 |
| 30 | Wholesale and Retail Trade Industry | 182 - 183 |
| 31 | Transportation and Storage Industry | 162 - 174 |
| 32 | Communications Industry | 175 - 178 |
| 33 | Utilities | 179 - 181 |
| 34 | Finance, Insurance and Real Estate | 184 - 190 |
| 35 | Health and Hospital Industry | 196 - 198 |
| 36 | Business Services Industry | 192 - 193 |
| 37 | Accommodation and Food Services Industry | 199 - 200 |
| 38 | Other Personal and Misc. Services Industry | 191, 194, 195, 201 - 209 |
| 39 | Dummy Industry I | 210 - 213 |
| 40 | Dummy Industry II | 214 - 215 |
| 41 | Transportation Margins | 216 |